The Chemical Age

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Notes and Comments

Analytical Chemistry

THE stimulating address delivered by Dr. J. J. Fox to the London Section of the Society of Chemical Industry upon "Some Advances in Analytical Chemistry" deserves careful study. The undoubted interest manifested in this address at first sight renders it the more inexplicable why there should be that neglect of analytical chemistry as a branch for research in universities—of which Dr. Fox complained. The whole fabric of chemical industry is based on analysis. Plant control, the purchase of raw materials, the market value of finished products, the cause of breakdowns, are all examples wherein analytical chemistry is either essential or advantageous.

Analytical problems fall into two categories. One of these is to devise means for performing an analysis that has not hitherto been required; it may be either of a known substance in a new material, or of a new substance in a known material. The academic chemist does not generally hear of this problem until the practising analyst, who has met it, has solved it—and that may serve to explain part of the neglect. The second category is to ascertain new methods for known analyses. It is here that the research workers in universities might assist industry, but it is generally necessary for the industrialist to acquaint the academic worker of the existence of the problem; it is another phase of the old problem of bridging the gap which must, in the nature of things, always exist between the university and the works. In Dr. Fox's words: "The university authorities are not aware what the practising analytical chemist has to do, or why he has to do it." We believe that if some method existed whereby industry and the universities could interchange ideas, the universities could be of far more assistance to practising chemists than they are now; we commend this idea to Dr. Fox and suggest that he should sponsor a movement in this direction.

Mass Production Methods

NEW methods to give additional accuracy are always acceptable and are always worth pursuing. A classic example of the type of work required is the text-book, by Dr. Mellor, devoted to analytical methods in the ceramic industry. The prime problem to-day is to devise methods that are adaptable to mass production methods. The determination of carbon in steel is an example of what is required. The melt in the converter is held until a quick analysis has shown that the carbon content is correct, and repeated rapid determinations must be conducted during the whole cycle of operations. Dr. Fox mentioned that his laboratory had to make 1,000 determinations per day of moisture in tobacco. Many other examples might be given of elementary analyses for which the older methods taught to the student when he begins the study of analytical chemistry must be superseded by methods capable of extremely rapid performance, and necessarily by not highly skilled workers, since the skilled worker would not be content with such a dull routine monotony.

To judge from Dr. Fox's description of recent advances, it is difficult to understand how the term "chemistry" can apply to these methods. They all are based on the measurement of a physical property and are undoubtedly physical determinations. That may be another reason why the chemistry departments of universities do not pay much attention to analytical chemistry. The chemistry and the physics departments are customarily separate and hold their court on different floors. There is even a little mutual disparagement, and the physicist would not be expected to worry himself about the mere analytical problems of the chemist, nor would the chemistry lecturer consider that he was teaching chemistry if he was instructing his students to determine moisture in flour by measuring the dielectric constant by means of a resonance curve. There is increasing argument in favour of combining chemistry and physics in one department and as one subject, but we hardly imagine that this argument will appeal with sufficient force to the academic mind.

Inferiority Complex

DR. FOX referred also to the inferiority complex which assailed the analyst. The analyst was too frequently regarded as "small beer" by the research chemist and others. This attitude Dr. Fox personally deplored. The analysts are themselves partly to blame. Mass production methods and the standardisation of "testing" until it can be performed by the boy who has just left an elementary school have resulted in a class of "chemists" whose only qualification for the name is that they use chemicals and express their results in percentages of substance present. It happens from the nature of the practising chemists' work that all these humble practitioners belong to the genus "analyst." For one hundred of these humble prac-

titioners there is but one capable chemist of a genus recognised by the Institute of Chemistry. It is small wonder that the term " analytical chemist " does not bring to the mind the same mental picture as the term " research chemist." Standardisation of the right to use the name " chemist "—devoutly to be desired, but apparently never to be consummated—appears to be the only solution.

The Rubber Agreement

THE agreement for the regulation of exports from the rubber producing countries, announced last week, has given rise to the hope that after a long period of depression the industry will be once again placed on a sound economic basis. No new industry has been established and grown to such great importance in so short a time as plantation rubber. The first step was taken fifty-eight years ago to experiment with an idea for cultivating rubber trees, but it was not until the early years of the present century that plantation rubber was produced in appreciable commercial quantities. In 1900 the world production of rubber was about 53,900 tons, of which only four tons was from plantations. Within the following ten years plantation rubber amounted to 8,200 tons out of a world total of 70,500 tons. Over-production has, for the time being, created a difficulty in the rubber industry. While the object of the present scheme is to regulate production so that it may conform to current consumption requirements, and to re-establish the industry on a sound economic basis, restriction must not be regarded as a permanent feature of the future of rubber.

On the contrary there are definite prospects of further large expansion in the use of rubber and of a steady increase in consumption which will eventually absorb the present potential production. The world consumption of 810,000 tons of rubber last year was a record amount, notwithstanding the trade depression throughout the world. There is still scope for a further large increase in the use of rubber of chemical engineering, and in the use of motor vehicles, for which rubber is essential, while considerable expansion can be looked for in connection with electricity, road construction, flooring, upholstery, railway rolling stock construction and the textile and kindred trades, apart from the many smaller articles in household and general use, the number of which is constantly growing.

Carbon Bisulphide Dangers

THE Home Office memorandum on the dangers attending the use of carbon bisulphide will be carefully studied throughout the chemical industry. The use of a liquid which is highly volatile, highly inflammable, the vapour of which so readily forms an explosive mixture with air and which is toxic even in low concentrations cannot be permitted without the most extreme precautions. Fortunately any escape of this gas cannot well be overlooked since its smell is peculiar and characteristic, and although the recital of the properties of the substance may make it appear exceedingly dangerous, it is probably but little more so, if any, than the gas and benzol daily handled in huge quantities by the gas industry, and by their customers who are for the most part entirely unskilled. That unexpected occurrences may lead to serious effects, however, is shown in the tragic mishap at Billingham. Ammonia is being used under pressure for refrigerating plants in many places, generally not under highly skilled supervision. The utmost care must be taken to study carefully the possibilities of accident and to guard against them in the design of plant and buildings. Sulphur, on account of the ready oxidisability of its compounds, is one of the most potentially dangerous elements. A fruitful source of works explosions a few years ago was the unsuspected formation of iron sulphide on the interior of iron pipes and other plant. In the particular form in which it was deposited the sulphide was liable, upon the first contact with air, to oxidise with evolution of heat sufficient to make the mass red hot. Any explosive vapour that might have been present thereupon "went up"—sometimes with fatal results. Can CS_2 form spontaneously explosive compounds during normal handling? We do not recollect any accident from this source but that is not to say that conditions may not arise wherein it is possible; certain firms using carbon bisulphide recommend the avoidance of brass fittings as they find that copper sulphide will be formed by the action of the CS_2 and may oxidise and become hot enough to cause an explosion of the air-CS_2 mixture in exactly the same way as the iron sulphide will do. No pains should be spared to provide for the most unlikely happenings; and any observations or occurrence that may have the least influence in modifying the handling of a potentially dangerous substance should be reported at once to the Home Office in order that the fullest information shall be available at the central source for the benefit of all.

Where Unity Counts

ALTHOUGH we are not privileged to report the whole of the proceedings of the British Chemical and Dyestuffs Traders' Association, no one can read the brief account of the annual meeting last week without realising the value of the Association to the chemical merchant, hampered as he is on all sides with quotas, licences, regulations and restrictions. Whatever the chemical manufacturer may think, the merchant remains an essential link in the chain of chemical distribution. He is needed to-day in commerce as much as ever and, although efforts have been made to dislodge him, he still survives. Without the Association, the individual chemical trader would be at a distinct disadvantage in negotiations with Government departments and official bodies, but through its recognised officials he is able to present a strong case. He may not always get all he wants, but he has the satisfaction of knowing that the Association enjoys the confidence of the powers that be and, as a rule, it obtains for its members the consideration they deserve.

Mr. H. Gilliat, who has been re-elected chairman of the Association and who makes frequent journeys from Leeds to London to attend to its affairs, considers that there is more unity in the chemical trade than in any other trade in the country. We are glad to hear that the chemical and dyestuffs traders display such harmony, and we cannot help wondering when it will be possible to say the same of the chemical profession as represented by the multitudinous societies which talk of amalgamation but remain miles asunder.

Recent Developments in Titanium Pigment Manufacture

Results of Tests at Luton

On May 10, the anniversary of the opening last year by Dr. E. Leslie Burgin, Parliamentary Secretary of the Board of Trade, of the first large scale works in this country for the manufacture of titanium pigments, at Luton, Mr. Douglas Wait and Mr. I. E. Weber, of National Titanium Pigments, Ltd., presented a joint paper on "Titanium Pigments," at a meeting of the Oil and Colour Chemists' Association, held at the Institute of Chemistry, under the chairmanship of Mr. G. A. Campbell.

After referring briefly to titanium ores, which are the basis of the manufacture of titanium pigments, the authors outlined the history of titanium salts and titanium pigments, which dates back to 1870. It was not until 1910 that work was done on the production of colouring matters of great covering power from titaniferous ores. This originated in Norway. In 1911 there was a further development in the production of pigments from such ores and 1913 marked the beginning of a period relating to the actual production of white titanium pigments. In 1916 patents were taken out in America and in England and further work was done in Norway. The position in 1922 was well summarised in the paper read before the Royal Society of Arts in London by Mr. Noel Heaton. The present authors emphasise the point that the development in the manufacture of titanium pigments is really a post-war one and was carried on by the Titan Co., of Norway, the Titanium Pigment Co., of the U.S.A., and subsequently the I.G., of Germany, working in conjunction with the two former companies. In this country the work has been taken in hand by National Titanium Pigments, Ltd., the company in which the authors are interested. Patents owned by B. Laporte, Ltd., National Titanium Pigments, Ltd., and Titanium, Ltd., of Canada, have been pooled and the paper gave an outline of possible methods of manufacture, followed by a series of lantern slides of the Luton works.

Remarkable Strength

Discussing some of the properties of titanium pigments, the authors mention that the remarkable strength of titanium white pigments is a sufficient reason for their extended use. They impart to white paint a covering power to a greater degree than any other white pigment. Unit weight of titanium pigment will whiten more surface than a unit weight of any other white pigment. Commenting that white lead and linseed oil were the main ingredients in white paint two generations ago, the authors remark that whilst the present generation is trying to make titanium paints with refined linseed oil and with stand oil, the coming generation sees that with the advent of titanium it is now not sufficient to produce a good medium for all pigments, and is therefore trying to evolve one just as suitable for titanium as refined linseed oil was for white lead in its day, and stand oil is for zinc oxide. Although titanium paints have the most important property of white paints in the highest degree, *viz.*, hiding power, those made in the early days had the objectionable property of chalking excessively when exposed outside. Inside paints, however, present no such difficulty. An important feature of titanium white paints is its retention of whiteness in the dark, while many other paints are liable to pronounced after-yellowing. For a suitable medium, the following is a typical inside paint: Strong titanium pigment 40 per cent., enamel oil 35 per cent., rosin ester 5 per cent., white spirit 19 per cent., cobalt linoleate (4 per cent.) 1 per cent.

With regard to outside paints, the authors described their methods of testing on wooden pieces 36 in. by 4 in. by ½ in. each of which is divided into four sections for the purpose of the tests. Paints are made up of proper consistency, carrying about 50 per cent. of the pigment to be tested, this, of course, varying largely according to the type of titanium, or other pigment or class of paint being tested, say, from 30 per cent. to 75 per cent. In the case of titanium it has been found that the mere relative proportions of pigment and medium may vary by a short time the initial appearance of chalking, but has little effect on the result, say, in six months' time.

Two types of tests are carried out. The first employs a number of titanium pigments, and perhaps other pigments and mixtures of these, possibly with extenders, but using only one medium. For convenience, the following medium, which is regarded as being somewhat better than refined linseed oil, but yet not so good as entirely to prevent chalking has been adopted; refined linseed oil 60 per cent., stand oil 20 per cent., white spirit 18 per cent., cobalt linoleate (4 per cent.) 2 per cent. In the other type of test, one selected titanium pigment or mixture with other pigments is tried with several different paint media. Only one paint is made, which acts as priming and finishing, and sometimes three coats are given. Usually, also, a finishing coat is put on tinted qualitatively to approximately a standard shade with yellow oxide of iron. In a complete test board, therefore, there would be a section with three coats, a section with two coats, a section with priming only and a section with one coat priming and one coat tinted finishing. When dry, the panels are exposed outside facing south at an angle of 45°. In all cases the paint tests are done in sets under identical conditions and compared with each other, and never one from one set with one from another.

Some General Conclusions

Slight variations which are not under control have some effect on the results, and the initial weather also appears to have considerable bearing. It is not wise to attach too much importance to any one set of tests. In these circumstances, the following general conclusions are interesting:

(1) It is important to make the complete medium and bring it in contact with the dry pigment. This mixture is passed twice through a porcelain disc cone mill and the paints kept in glass bottles to observe settling. Grinding in oil to paste consistency is not done because the quantities are so small.

(2) Paint made by mixing the pigment hot with the non-volatile portion of the medium, chalks slightly less than that normally made, but this does not prevent chalking.

(3) The addition of 20 per cent. or more of stand oil is a decided improvement over straight refined linseed oil and the authors prefer it in general to pale boiled linseed oil, blown linseed oil or thickened China wood oil.

(4) The addition of a resin to the oil mixture is a further improvement in moderate amounts up to 10 per cent. or 20 per cent., but larger amounts induce cracking. Taking cost into consideration, rosin ester is the most useful material to use, but gum and several synthetic resins give slightly better results at a higher cost.

(5) Manganese lead and cobalt driers have been tried and each appears to be preferable at certain times during a long exposure, but on the whole any good pale drier is regarded as equally serviceable.

(6) Exposed oil titanium films are highly acid while those of white lead and zinc oxide are not. Mixtures of titanium and these pigments have been tried and the best results were obtained with mixtures of titanium and white lead in about equal proportions.

(7) Several tinted paints have been made, but there has not been any undue fading in titaniums, apart from the films which chalked, and the so-called fading is attributed to chalking with possibly one or two exceptions in the case of lake pigments.

(8) Various extenders have been tried with strong titanium pigment and the results are as follows:—

Barium carbonate, best.—No chalking.

Selenite, barytes, strontium carbonate, silica.—These four are more or less equal but not quite so good as barium carbonate.

Talc, gypsum, blanc fixe, calcium sulphate precipitated.—All equal.

Blancopone, strontium sulphate, dehydrated selenite, asbestine, china clay.—All equal.

The last two sets are more or less equal, but are decidedly inferior to the first set.

Paris white, calcium carbonate precipitated.—Equal and very bad.

(9) Great importance is attributed to the priming coat, and separate exposure tests at present indicate that a mixture of white lead, titanium white and Ilmenite form a suitable priming for titanium white paints.

(10) The degree of chalking can be controlled to make satisfactory outside finishing paints in which the bulk of the hiding power is due to titanium pigments.

The Problem of Chalking

Dealing with the question of chalking, the authors say they know too much about the cause to put forward a bad theory, but too little to give a good theory. Their main object was to prevent chalking and having looked at the problem from every angle they asked the meeting to consider it as follows. Chalking occurs only in the presence of strong solar radiation, moisture being an important factor. It has been thought that it is due to lack of molecular or other contact or attraction between the so-called non-polar pigment and the medium. This would appear to be only a secondary reason, for titanium films last indefinitely inside. The prime cause of the destruction of the loose contact is solar radiation, not necessarily of visible rays. Resistance to radiation in many cases appears to be a function of materials having either a high atomic weight or a large molecule. Substances with high atomic weight are impervious to X-rays but titanium has the low atomic weight of 48 and therefore would not be impervious to radiation and would never be as resistant as lead in a linseed oil medium. Two ways of overcoming this are obvious; first, to associate titanium with a high atomic weight element, either by chemical combination or by making a mixture of titanium pigment with another pigment of a high atomic weight element. Both these methods have been found to give good results in practice. By combining titanium with barium a compound has been found which is little affected by solar radiation. The second method of preventing chalking is to mix the pigment in a medium of as high a molecular weight as possible; his also gives good results in practice.

It is suggested, therefore, that chalking may be due not to chemical inertia, but rather to lack of physical inertia, but the authors emphasise that they do not put this forward as a scientific theory of chalking, but merely as an interesting outlook on the problem.

The final portion of the paper indicated some other applications of titanium pigments such as in nitrocellulose lacquer, alcohol varnish, spirit varnish, water varnish, printing ink, plastics, rubber, cosmetics, soap, paper, rayon and ceramics.

Points from the Discussion

The PRESIDENT said that titanium oxide seemed to be a paradox among compounds. On the one hand the paint trade was asked to accept its non-polar property—its inactivity—and yet in certain other industries, for instance, in connection with the de-lustring of artificial silks, there was definitely a good deal of nervousness regarding its use because it was a little too active. In the case of certain vat dyes it seemed to promote fading where otherwise the dyes were fast. As regards the incorporation of titanium pigments with linseed oil, these had been found to be peculiarly inactive; so inactive, indeed, as to make the brushing out properties not quite so easy flowing as was the case with certain other pigments. This raised the question of whether it was physical inertia from which titanium oxide suffered in incorporation with linseed oil and it would be interesting to know if the authors had carried out any work from the point of view of particle size or particle shape of titanium oxide.

Mr. T. HEDLEY BARRY said the works of the National Titanium Pigments, Ltd., at Luton, were a credit to British chemical engineering. The authors had raised an important point in suggesting that the medium for titanium must be specially considered. He had been associated with tests on titanium and had been astonished by the fact that by suitably adjusting the medium it was possible practically to eliminate chalking. Certainly more research was required in this connection. As to exposure tests, he asked whether the authors had carried out any experiments in which paints were painted in situ and compared with tests carried out indoors. He recalled tests on two varnishes, one carried out in situ and the other indoors. The varnish applied in situ broke down completely in three months whereas the other one was good at the end of nine months.

Dr. G. F. NEW said a matter which impressed him in connection with the titanium question was the co-operation existing between the European and American investigators which really set an example to the scientific and technical world. Referring to the authors' exposure tests, he remarked that although the boards were 36 in. by 4 in., they were divided into four sections so that the actual test piece was 9 in. by 4 in. Did the authors get any further information by this sub-division of the panels? This raised the desirability of some standard size test panel.

Mr. L. WILSON said he had used titanium white in a part of Africa where the hours of sunshine were roughly 80 per cent. of the hours of daylight, and at an altitude of 5,000 ft. Consequently more of the ultra-violet rays were apt to filter through. His experience of titanium white in these circumstances was that when used alone there was a tendency to chalk, but when used in conjunction with a suitable amount of white lead or zinc white there was no such disadvantage and the amount of chalking was due more to the composition of the medium than to the actual proportion of pigment used.

A Red Herring

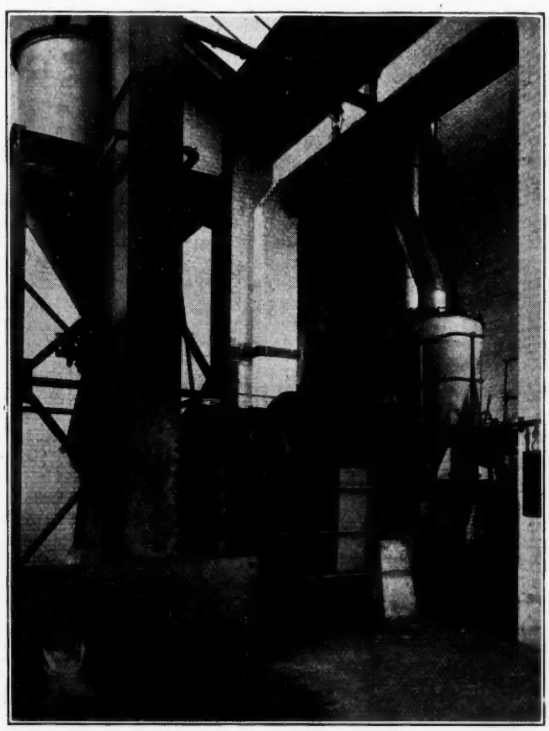
The authors, in the course of their replies to the discussion, said that the copperas obtained from titanium sulphate can be removed completely and is used very largely for making iron pigments. As to fading, it was possible that in such cases the titanium had been produced more or less in the colloidal state and absorbed the dyestuff, but the pigments made at Luton were all furnaced and in that process they lost the property of absorbing the dyestuff. Generally speaking, the fading attribute of titanium in this connection was regarded as a red herring. It was agreed that there might be something in the idea of grinding pigments and keeping them for a long time, but it was at the same time pointed out that this old practice had practically disappeared. The titanium compounds were always kept 24 hours, however. Titanium had a good affinity for water but not such a good affinity for oil as the basic pigments. Those pigments which showed a slight acid reaction gave rather a bad affinity for oil. This matter, however, had not been gone into very far. As to the prospects of a lead-titanium composite pigment being placed on the market, it was suggested that better information could be obtained from the market. In the same way no information was in the possession of the authors as to any possible rust inhibiting properties of ilmenite for the reason that they had not made any paints using ilmenite. On the chalking question, it was observed that the whole trade is not very far advanced with regard to this at the moment.

Size of Test Panels

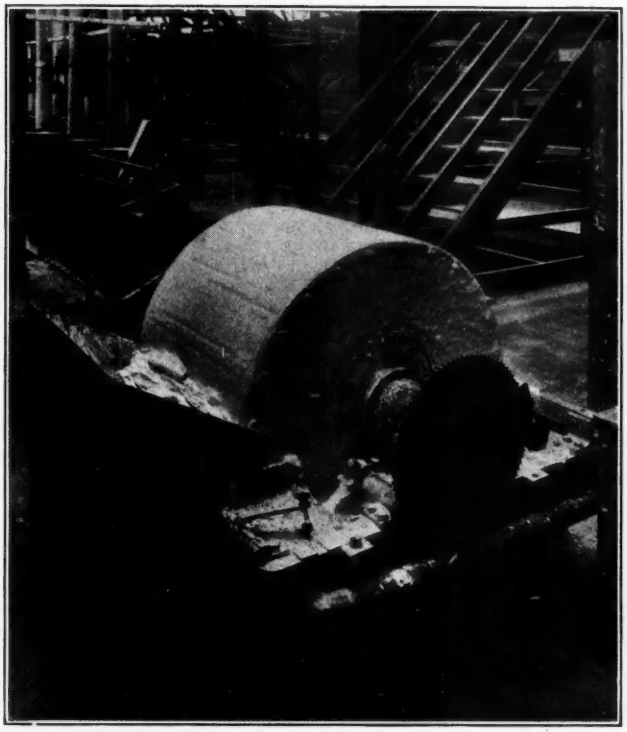
Dealing with the comments of Dr. New on the size of the test panels, Mr. Wait said although the works at Luton were small there was a big field in which tests were carried out on large and small test pieces. The general idea was to have test pieces of a size to suit the tests. The boards 36 in. by 4 in. were the standard size and sometimes it was convenient to have more than one test on a board. In some cases there were four tests on each board. He agreed that these tests did not always tell the same story, but judging the tests on their finishing it was possible to arrive at reliable results. Certainly the wood was a big factor and by choosing local wood he believed they got as good samples as if they went to all the trouble and expense of obtaining selected woods from a distance. The remarks with regard to the use of titanium white in Africa were specially pleasing to him because large consignments had been sent there.

A hearty vote of thanks was accorded the authors at the conclusion of the discussion.

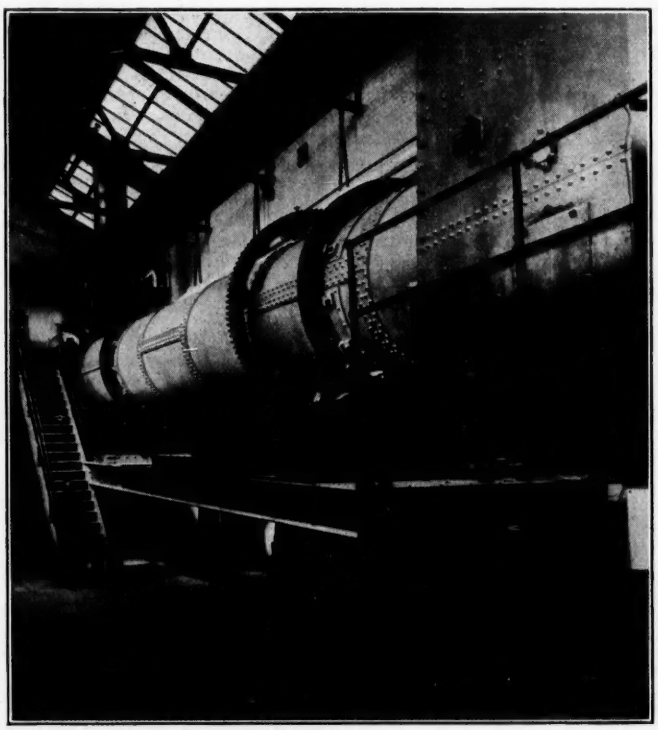
National Titanium Pigment Plant at Luton



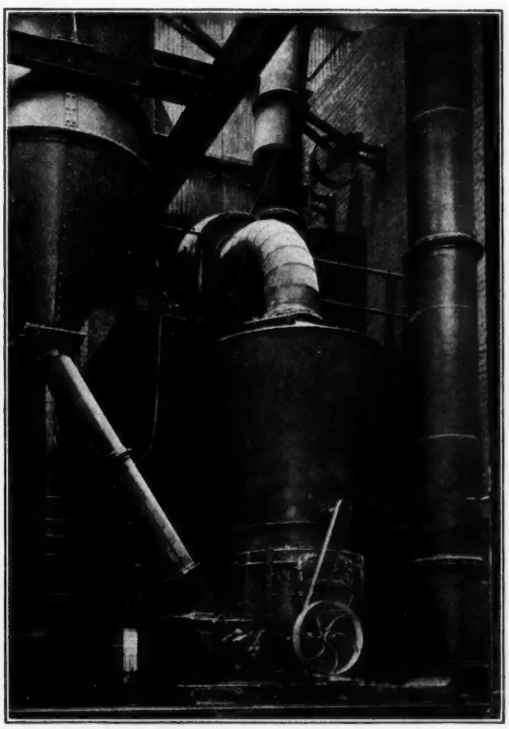
The Hardinge Ball Mill for grinding Ilmenite Ore to 200 Mesh.



Dorr-Oliver Rotary Vacuum Filter de-watering the Pigment.



Rotary Dryer and Calciner designed by B. Laporte, Ltd.



Raymond Mill for the final grinding of the Pigment.

The British Association of Chemists

London Section Annual Meeting and Concert

THE annual meeting of the London Section of the British Association of Chemists was held on May 11, at the Broad Street Station Restaurant, London. Mr. J. C. Mellersh, chairman of the section, presided, and there were over a hundred members present.

Miss W. WRIGHT, hon. secretary, stated that the committee was pleased to report a satisfactory year of progress and work. The section had added one hundred and thirty-nine new members to the roll, which now stood at over 800. The social functions of the section had been well attended and the dinner and dance in March was markedly successful. At the annual general meeting of the Association at Manchester last November a resolution was passed admitting two new classes of chemists. From remarks and questions which had been addressed to her she gathered that some confusion still existed in the minds of some of the members as to the status of "Fellows" and "Associates."

When the Association was formed in 1917 the problem of unemployment had not arisen and it had no unemployment fund. There was no mention whatever in the rules as to the nationality of a chemist who wished to join the Association. Provided the necessary qualifications and experience of an applicant satisfied the registrar and committee he would be elected to membership. As time went on the problem of unemployment became acute. An unemployment insurance fund was formed in 1922 and gave great assistance to members in time of financial need. This fund was steadily assuming a more and more important position in its activities.

Position of the Foreign Chemist

In the past few years there had grown up considerable difficulties in international finance and a general desire of each nation to conserve the finance of the home country. It had always been the policy of the Association to make every effort to fill vacancies with British chemists and that only after failure to find a suitable applicant should a licence to a foreign chemist be granted.

It was realised that it was an unsound policy to admit foreign chemists here on licence to full membership of the Association which would automatically carry rights to the unemployment fund when the licence expired and he returned to his native country. It was considered that the fund had been built up by British chemists for British chemists and should be used for their assistance either at home or abroad. The Association had no animosity whatever against fellow chemists in other countries and had every desire to extend to them any courtesy and help in its power.

The class of "Associate" had therefore been created for chemists of non-British nationality who woulud otherwise be eligible for full membership and they were entitled to the advice and help of the Association in all matters connected with their profession and to the facilities offered in its social activities. The only benefit not extended to them was the unemployment insurance and as their stay in the country was limited this could hardly be expected. The class of "Fellow" had been created for persons of high chemical ability in industry or academically who wished to be associated with the work of the Association.

Election of Officers

The following officers were elected for the ensuing year: Chairman, Mr. J. C. Mellersh; hon. secretary, Miss W. Wright; hon. treasurer, Mr. G. T. Gurr; committee, Messrs. L. J. Couzens, F. B. Gatehouse, Professor A. G. Green, G. W. Himus, A. Kagan, Capt. R. P. Porter, Dr. E. R. Redgrove, W. Garvie, W. C. Peck, A. W. H. Upton, A. J. C. Cosbie, E. C. Martin, W. F. Pavitt, E. A. Roff and W. Hall Simmons. The following are ex-officio members of the committee: Mr. S. R. Price (chairman of council), Mr. C. S. Garland (past-president and vice-president). Mr. Paul Haas, Mr. J. B. P. Harrison, Mr. W. H. Woodcock (hon. treasurer of the Association), and Mr. H. T. F. Rhodes (hon. editor).

Mr. C. B. WOODLEY, the general secretary of the Association, laid stress on the work of the legal aid department during the past year. He drew the attention of chemists to the need for due consideration before signing any formal paper when taking up an appointment. It had been established that a chemist was entitled to three months' notice or salary in lieu thereof, but if a chemist carelessly signed a paper agreeing to a shorter term of notice the Association could do nothing for him. Mr. Woodley also commented on the work of the appointments bureau and said that in his experience an employer was generally ready to pay a reasonable salary for a good man.

Professor A. G. GREEN, vice-president, spoke on the desirability of closer working between the different chemical societies and hoped all present would use what influence they could to bring about this desirable end.

Innate Jealousy and Individualism

Professor G. T. MORGAN said that the unison of the several chemical organisation was a subject very dear to him. At present the headway made was slow but he still hoped. The decentalisation of chemical organisations from the parent body, the Chemical Society, had taken some 60 years and it looked as if it would taken a good many to reunite them again. There was a great difficulty in persuading specialist societies to consent to become a sub-group to the Chemical Society and until this innate jealousy and individualism could be overcome little headway was likely to be made. He congratulated the London Section on the increase of membership and said that this Section alone was much larger than some of the specialist societies.

Mr. WOODLEY pointed out that the special aid fund was unhampered by rules and could therefore be administered as the special need arises. Out of this fund monies had been advanced to members during sickness and on occasion the railway fare for a member to attend an interview, and even assistance during the first month after taking a post had been granted.

On a proposal from the body of the meeting a collection was taken for the special aid fund, and realised £14 10s.

The meeting concluded with a concert. During the second half of the programme Mr. Rhodes (hon. editor) gave a short paper on "Forgery," which was greatly appreciated. The artistes included Miss E. Starkey, Mrs. Golda Sher, Mr. Albert King, and Miss Dorothy Holden accompanist.

Oil and Colour Chemists

Annual Meeting : The New President

AT the annual general meeting of the Oil and Colour Chemists' Association, held at the Institute of Chemistry, 30 Russell Square, London, on May 10, Mr. G. A. Campbell was elected president to succeed Mr. J. A. F. Wilkinson. The vice-presidents elected were Messrs. M. E. Dougherty, S. Hadfield A. Hancock, D. Wait and J. A. F. Wilkinson. Mr. Forrest Scott was re-elected hon. secretary, and Mr. H. D. Bradford was elected hon. treasurer in succession to Mr. M. E. Dougherty. Dr. O. Cutter was elected hon. auditor in succession to Mr. Bradford. The Council's report for the past year was unanimously adopted without discussion. This showed that the membership continues to increase, the total number being 468 against 454 in the previous year.

The following new members of Council were elected: Country members: H. Clayton and C. H. Dunkley; town members: F. W. Clark, A. J. Gibson and S. A. de Lacy. At the conclusion of the annual general meeting, a gold watch was presented to the secretary, Mr. J. H. Aiken, to mark the completion of ten years' service with the Association.

At an ordinary meeting which followed the annual business, Mr. Douglas Wait and Mr. I. E. Weber presented a paper on "Recent Developments in the Manufacture of Titanium Pigments," a report of which appears in pp. 421-423.

The Seventh Achema at Cologne

New Departures in German Chemical Plant Equipment

THE seventh Achema (German Chemical Plant and Apparatus Exhibition) is being held at Cologne, May 18-27, where a unique collection of exhibits provides first-hand information on the progress of applied chemical engineering in Germany. Three large halls house the exhibits, other sections being devoted to such amenities as cinema and lecture theatre. Acid-proof stoneware and other ceramic plant, rubber and other non-metallic equipment and industrial measuring and control instruments are exhibited in one hall. The second hall is devoted to scientific instruments and laboratory equipment, including optical and fine mechanical instruments, and a special display of apparatus illustrating the possibilities of precious metals. Compressors, pumps, kneaders, autoclaves, packing machinery, etc., are grouped in the third hall.

Plant Manufacture

The exhibit by A. Borsig covers all branches of the mineral oil industry as well as the extraction and refinement of animal and vegetable oils. The Lurgi stand demonstrates the extensive experience of this concern in the erection of plant for all branches of the heavy chemical industry, soaps and fats, and gas engineering. Bamag-Meguin A.G. are well known in respect of plant for nitric acid, nitrogenous salts, benzol and other tar products, oil and fat extraction, fat-hardening and the electrolytic production of oxygen and hydrogen. Karl Fischer is another concern exhibiting a remarkably wide range of plant, including that for the production of formaldehyde, lactose and vanillin.

C. H. Jaeger and Co. feature rubber-lined acid-resisting centrifugal pumps, circular reciprocating pumps, centrifugal and reciprocating blowers distinguished by frictionless movement, with no interior lubrication required so that compressed air is delivered entirely uncontaminated by oil. Richard Forster show their glandless centrifugal pumps (capable of handling acids, alkalies, sludges, etc.), reciprocating pumps with acid-proof "siliceous" (Kieselguss) linings, and lead-lined reciprocating pumps. Amag-Hilpert-Pegnizhütte feature their patent acid centrifugal and turbine pumps in Krupp's thermisilid (iron-silicon casting), with guaranteed resistance to sulphuric acid, nitric acid, hot sulphur dioxide and acetic acid; this firm also supply multiple stage chlorine compressors constructed to the patented design of the I. G. Farbenindustrie.

High Vacuum Pumps

The firm of A. Pfeiffer demonstrates its new Brüden pump capable of dealing with a maximum volume of 100 cubic metres per hour and attaining a vacuum of 0.1 mm. mercury. This firm offers no fewer than 40 different types of pumps ranging in capacity from 250 metres per hour downwards, and with a maximum vacuum of 0.02 mm. mercury. Klein, Schanzlin and Becker A.G. have on view their slide-valve suction pumps in designs for single stage working (yielding a vacuum of 3 mm. mercury) and also for double stage operation (0.2 mm. mercury). Mako and Vacuum-Trockner G.m.b.H. supply a remarkably comprehensive range of pumps producing very high vacuum ranging in capacity from 2.5 to 250 cubic metres per hour.

Eisenwerk Kaiserlautern show interesting examples of acid-proof enamelled autoclaves. Harzer Achsenwerke G.m.b.H. specialise in rubber-lined autoclaves. Didier-Werke A.G. also feature acid-resistant autoclaves. Carl Canzler G.m.b.H. have devoted special attention to autoclaves in VA steels. Samesreuther G.m.b.H. have developed an unusual type in the shape of large steam-jacketed stirring autoclaves of 1,000 litres capacity. Here the jacket is welded on by a special technique ensuring exceptional safety at a maximum steam pressure of 40 atmospheres, the autogenously welded steam jacket, whilst still warm, being subjected to pressure at certain points which thus become welded to the pressure vessel itself. Deutsche Vacuumapparate G.m.b.H. are represented by stirring autoclaves. Rheinhütte G.m.b.H. likewise make a feature of stirring autoclaves. Gebler-Werke manufacture cast and wrought iron enamelled autoclaves in all dimensions with high resistance to acid and heat.

The Hochdruck-Apparate-Bau G.m.b.H., whose activities cover plant for the liquefaction of coal, hydrogenation of coal and oil, and high pressure steam installations, exhibit both large-scale plant and the smaller units indispensable for preliminary laboratory work. Great success has attended the use of their new reaction vessel which is equipped with a specially designed high pressure cover.

Carl Canzler G.m.b.H., specialise in acid-proof distilling plant constructed in VA steels. Similar exhibits appear on the stands of Deutsche Eisenwerke, Mitteldeutsche Stahlwerke, and Rheinhütte. Carl Canzler have executed a particularly notable piece of work in their high vacuum stirring vessel of V2AE steel fitted with heating coils. The whole of this apparatus was autogenously welded. They are again prominent among distilling plant of non-ferrous metal construction by their pure nickel installations. W. C. Heraeus G.m.b.H., construct both nickel and silver distilling plant. Copper plant is another speciality of Carl Canzler, who have constructed a very large copper distilling unit.

In non-metallic materials of construction Keramchemie-Berggareen G.m.b.H., are represented by a comprehensive collection of chemically resistant plant, including acid- and alkali-resistant and gas-tight absorption towers, storage vessels, linings, floorings; they also supply acid-resisting paints, cements and packing rings. Deutsche Steinzeugwarenfabrik make a fine display of acid-proof stoneware conforming to German specifications. Other exhibitors in this line are Deutsche Ton- und Steinzeugwerke, Franz Gerhardt, and Westdeutsche Steinzeugwerke. The latter manufacture an extensive range of stoneware equipment including baths, basins, tubes, pumps and storage vessels, some of which are armoured. The exhibit of Gebr. Lüngen covers a wide range of ceramic materials including silica and chamotte stone.

Filtration Plant

Humboldt-Deutzmotoren A.G. feature suction-filtration plant for handling all types of sludges. Wilhelm Schuler G.m.b.H. are the pioneers in filter stone manufacture and the exhibits on their stand include filter stone tubes for treatment of all liquids and gases. Deutsche Steinzeugfabrik are also suppliers of filter stone tubes, in addition to chests and candles. Other exhibitors of filter stones are Filterwerk Meissen, Gebr. Lüngen and Schumachersche Fabrik. The latter manufacture a notable stoneware pressure filter of manifold applicability.

Mitteldeutsche Stahlwerke A.G. have developed an efficient spray coating process which can be used to apply films of aluminium, tin, zinc and lead. Continental Gummi-Werke A.G. show their Conti-Vulkanit brand of acid-proof ebonite, as well as their special resistant table-top coating for factories. Harzer Achsenwerke G.m.b.H. also supply a resistant ebonite, whilst Franz Clouth and New York-Hamburger Gummiwerke demonstrate the potentialities of ebonite-lined equipment. A. W. Andernach G.m.b.H. cater for users of asphalt-lined plant.

Acid- and heat-resistant enamels for cast-iron plant are among the exhibits on the stands of Mitteldeutsche Stahlwerke A.G. and the Pfaudler-Werke A.G. Acid- and alkali-proof ceramic linings are also supplied for all purposes by Keramchemie-Berggarten G.m.b.H.

Deutsche Steingengwarenfabrik, Deutsche Ton-und Steinzeug-Werke, Erzrost-Gesellschaft, and Keramchemie-Berggarten exhibit the possibilities of their respective special materials for the construction of washing and absorption towers. Samesreuther and Co. have executed a steel wash-tower, internally nickel-plated and externally heated by a welded-on steam coil.

Fried. Krupps A.G. have supplemented the exhibit of their well-known VA steels by Nirosta steels (chromium content of more than 20 per cent.), which are more easily cast owing to their lower fusion points. These steels are recommended in place of VA steels when the latter are not indispensable

or impracticable; a drawback of Nirosta steels, however, is their rather low impact resistance. Among the other comparatively novel steels exhibited by this firm is Thermosilid, which contains no less than 14 to 18 per cent. silicon, but is nevertheless comparatively free from brittleness as a result of the special treatment applied. Mention might also be made of their heat-resisting NCT and FF steels, the former containing more than 18 per cent. chromium and 10 per cent. nickel and the latter 5 to 30 per cent. chromium, but no nickel.

Bergische Stahlwerke also stand in high repute for special steels and show their heat-resisting chrome casting, Pyrodur, available in five qualities with a working range of 700° to 1,200° C.; they also show their HSB chrome alloy for castings which is claimed to fill the gap for a rustless steel which can be easily cast and requires no special heat treatment for strengthening. Sicromal, the chromium-steel alloy of the Deutsche Röhrenwerke A.G., is a highly esteemed material for high-pressure plant.

The hydrochloric acid resistant alloy, shown by Wesselinger Gusswerk-Rheinguss G.m.b.H., is claimed to have thoroughly consolidated its reputation since its introduction some three years ago. It exhibits marked resistance to hydrochloric acid at all concentrations and temperatures and also offers striking superiority over stoneware by standing up to extreme temperature fluctuations without mishap. P. Stühlen feature their iron-silicon casting (Siferrid) with a maximum of 18 per cent. silicon; this alloy is both acid- and heat-resisting to a high degree.

Mono G.m.b.H. have a comprehensive range of control instruments for carbon dioxide and monoxide, oxygen, hydrogen, methane, ammonia, etc. Neufeldt and Kuhn display distant-reading electrical recorders for all processes involving mobile components, as well as their electro-hydraulic current and voltage regulators. Bopp and Reuther have also explored the scope of electrical recorders, the result being effectively shown on their stand in the shape of an extensive collection of devices for measuring temperature, pressure, quantity, etc.

Gebr. Böhling demonstrate the special advantages of electrical heating over gas, steam, and radiant heat for the attainment of specified temperatures otherwise impossible by steam-heating without direct contact with flames. Over the temperature range of 150° to 600° C. this firm have adopted a system of induction heating based upon the patents of Neiss.

The Bamag electrolytic unit, shown by Bamag-Meguin A.G., is noteworthy in that it reduces the price disparity between electrolytic hydrogen and that produced by other methods, whilst yielding a far purer gas. It is of particular interest to smaller scale manufacturers of hardened edible fats.

Among the non-metallic constructional materials, attention will undoubtedly be attracted by the Haveg exhibit of the Säureschutz G.m.b.H., since this synthetic-base product has made striking progress during recent years. Equipment can now be supplied which resists hydrochloric acid, chlorine and dilute sulphuric acid at a maximum temperature of 130° C.

The Kolloplex mill, exhibited by Alpine A.G., satisfies the most exacting requirements in respect of output, fineness, and low running costs. Mill, motor, starter and load meter form a single aggregate which can be started up without further equipment wherever current is available. Thoroughness of grinding is efficiently controlled by a load meter.

General Meeting of the Chemical Workers' Union

A Summary of the Resolutions

THE May issue of the "Chemical Worker" gives a full report of the biennial general meeting of the Chemical Workers' Union, held in London on April 28 and 29, at which a large number of resolutions affecting the welfare of the chemical worker were passed.

In demanding the removal of the means test and task work regulations, the Union suggested early legislation to give effect to the following proposals as a means of relieving unemployment: Raising the school leaving age to 16 years and restricting the size of classes to thirty pupils; higher payment for old age pensions at earlier age with compulsory retirement from employment; a forty-hour working week without reduction of existing wages; statutory holidays and twelve days annual holidays for all workers with full pay.

Opposition to War

The meeting "viewed with great concern world complications heading for war" and called upon chemical workers in particular to take steps to organise an uncompromising opposition to war preparations and movements by exposing the appalling methods and consequences of modern warfare, particularly aero-chemical warfare and creating a mass refusal of workers of both sexes to participate in war movements. In short, it suggested that the workers' reply to a declaration of war should be a general strike.

Complete nationalisation of the medical services was advocated in a resolution submitted by the national executive council. It was urged that until such time as a national medical service came into existence, all retail and dispensing establishments contracting under the National Health Insurance Acts for supply of medicines, drugs and surgical sundries should be obliged to observe standard trade union wages and conditions; similarly that prices of drugs and surgical sundries listed on the N.H.I. tariff should be based upon the observance of trade union wages and conditions, recognised in the wholesale trade.

The conference called upon the Government to increase extensively the existing factory inspection staff with men and women having definite technical knowledge of the chemical industry and its processes and practices, so that chemical factories might be subject to more frequent and closer inspection. It was felt that such inspection should take place at least once every three months.

Government contracting departments and all local corporations and councils were asked to restrict contracts for chemical products to firms whose names appeared on the Union's "fair list," ensuring that "fair wages clauses" of contracts were properly observed.

A closer and more frequent inspection of all private and public dispensaries was urged with a view to securing higher standards of accuracy and cleanliness in the preparation of drugs and medicines.

The meeting "viewed with alarm" the adulteration of food and drugs (as indicated by the Minister of Health's report 1932-33), that must have dangerous effects on the health and development of the people. It was of the opinion that the Government should take immediate steps to establish a permanent commission to inquire into and set up a standard of purity for all food and drugs. The personnel of this commission should contain two Government chemists, two analysts appointed by the Society of Public Analysts, two representatives from food and drug manufacturers, and two representatives of trade unions whose members were engaged in food and drug manufacture.

Fascism and Labour

The attention of British workers in general and chemical workers in particuluar were called to the "rapidly growing Fascist danger in our midst." The resolution pointed out that "without the financial support of the Italian and German financiers and industrialists, Fascism could not have reared its head. At the moment, when British financiers and industrialists openly support British branch of Fascism, we shall witness and experience the attempted violent destruction of our Labour movement (industrial, political and co-operative), unless its members realise the danger and are prepared to organise an effectve defence of their institutions. To this end this conference instructs the executive council to co-operate with any other unions who are prepared to meet and organise joint action against the Fascist danger."

Physics in Industry

The Annual Report of the National Physical Laboratory

THE year 1933 has again been one of serious concern to all branches of industry, and this condition has been reflected in the activities of the National Physical Laboratory by the continued small demand for industrial investigations and routine tests of instruments. According to the annual report of the Laboratory for the year 1933 (H.M. Stationery Office, 13s. net), every effort has been made to press forward with the research programmes of the Executive Committee and of the Boards and Committees of the Department of Scientific and Industrial Research. Several items concerned with the establishment and maintenance of fundamental standards have reached important stages of progress.

Considerable attention has been given during the year to the best means of bringing before industry the results of the various researches carried out at the Laboratory. The annual meeting of the general board at the Laboratory, which is held in June each year, gives an opportunity to some 4,000 representatives of industry to make themselves personally acquained with the work of the Laboratory, while during 1933 lectures have been delivered by senior members of the staff, on various aspects of their work, at a number of provincial centres. The expressions of appreciation received in connection with these lectures have been very gratifying to the committee, and arrangements have been made for the continuation of the scheme as opportunity offers. Assistance on a wide variety of specific problems has been given during the year by personal discussion and by correspondence, apart from the cases in which experimental work is involved.

Heat Transmission

The first stages of the work on the heat transmission between metal pipes and a stream of surrounding air have been completed and the results have been published. The problem is essentially one of the transference of heat between two fluids through the medium of a "battery" of pipes, the fluids in refrigeration work being cold brine circulating within the pipes and a stream of air enveloping the pipes. The present investigations at the Laboratory has been concerned principally with the practical case of iron pipes of diameter 1¾ in., arranged in batteries of either the "square" or the "staggered" formation, at a spacing of 4½ in. The pipes were supported transversely in a closed-circuit horizontal wind tunnel, and measurements have been made only on the transfer at the outer surface of the pipe, since the laws at the inner surface are sufficiently well known. For convenience, the initial measurements were made on pipes hotter than air, and in such cases the pipes were heated more conveniently by an internal electrical heater than by passing hot fluid through them.

The main results of the work with hot pipes show that for any given transverse layer in the battery pipes, and for a fixed degree of turbulence in the approaching air stream, the observations can be correlated by the principle of dimensions, by plotting Vd/γ against $H/k\Theta$, where H is the heat loss per second per unit length of pipe, V the air speed, d in the pipe diameter, Θ the diameter excess of the pipe over the air, and γ and k are respectively the kinematic viscosity and thermal conductivity of the air, taken at a temperature mid-way between that of the air and that of the pipe surface. When plotted in this way, points with widely differing temperature excesses all fall on a single curve.

If the curves for different vertical layers in the battery of pipes are now compared, they suggest that the increased turbulence, which must of necessity occur after the air passes the first layer, increases the heat transfer; also that in the "square" formation the increase of turbulence is practically complete after passing two layers of pipes, though it increases up to the third layer in the "staggered" formation. The effect of eddy motion in increasing the heat transmission was found to be nearly 100 per cent. when the air stream approaching the battery was first made highly turbulent by inserting a frame of wooden laths in its path. When the pipes are colder than the air, the same numerical laws are found to hold as when they are hotter. This is equally the case when the pipes are covered with snow deposit, provided that d in the formula above refers to the outside diameter of the deposit and that Θ refers to the temperature difference between the air and the outer surface of the deposit.

In addition to batteries of pipes set transversely to the air stream, longitudinal pipes have been studied. The laws for these differ in many respects from those for transverse pipes. Thus the heat transmission decreases down-stream, instead of increasing, and the relationship between the two variables mentioned previously is linear in the case of longitudinal pipes. The effect of eddy motion is, as before, to increase the heat transfer, particularly in the sections first met by the air. It may be of interest to note that, other things being equal, the heat transfer from a longitudinal pipe is of the order of one half of that from a transverse pipe.

The Millilitre as Standard

In 1924 the Joint Committee for the Standardisation of Scientific Glassware recommended the use of the millilitre and the abbreviation "ml" instead of "cc," and it was advocated, in a test pamphlet "Tests on Volumetric Glassware," issued by the Laboratory in the same year, that the millilitre should be employed as the unit of volume for the calibration of volumetric glassware and that such glassware should be marked "ml" instead of "cc."

These recommendations have been widely adopted, and, in particular, the whole of the volumetric glassware submitted to the Laboratory for test is now, and has been for some years past, marked "ml" by the manufacturers. A further important step towards the general adoption of the millilitre has been taken during the past year. In the "Report on Metric Units of Volume" (No. 501, of 1933), issued in August, 1933, by the British Standards Institution, it is stated that "the Chemical Divisional Council of the British Standards Institution has decided that in all British Standard Specifications prepared for use in the chemical industry in which reference to metric units of volume is made, the unit to be employed shall be the millilitre (abbreviation ml). For example, the millilitre has been adopted as the unit in terms of which British Standard volumetric glassware shall be calibrated, and as the unit to be employed in the description of analytical methods."

Volumetric Glassware

The Laboratory has continued throughout the past year its co-operation with the Sub-Committee appointed by the Dairy Research Committee of the Empire Marketing Board to draft standard specifications for volumetric glassware used for testing milk and milk products. Further tests have been carried out on sample glassware made to draft specifications and further experimental work has been done in connection with the preparation of draft specifications. This standardisation work will, it is anticipated, be taken over by the British Standards Institution. The Volumetric Glassware Sub-Committee of the Dairy Research Committee has prepared a complete report of its work for communication to the British Standards Institution, with a view to publication by that body.

The Laboratory has also co-operated with the British Standards Institution Technical Committee on the Standardisation of Scientific Glassware and its sub-committees. It has assisted in the preparation of the "Report on Metric Units of Volume" referred to above, a draft report on the standard temperature for volumetric glassware, and draft specifications for interchangeable ground-glass joints, distillation flasks, graduated measuring cylinders, Nessler cylinders, centrifuge tubes and Petri dishes.

Standardisation of Hydrometers

A paper devoted to the fundamental principles of hydrometry was presented during the year to the World Petroleum Congress. This paper contained a recommendation "that hydrometers should be adjusted to indicate density—mass per

unit volume—in grammes per millilitre at 20° C. (International Temperature Scale)." This recommendation was endorsed by the congress, and will be referred to the appropriate standardising bodies in the various countries represented at the congress as a recommended basis for the standardisation of hydrometers used in the petroleum industry.

Prior to, and independently of the congress, a sub-committee for the standardisation of hydrometers was set up by the Technical Committee on the Standardisation of Scientific Glassware of the British Standards Institution. The Laboratory is represented on this sub-committee, which is actively engaged in drafting specifications for standard hydrometers and has adopted density—mass per unit volume—in grammes per millilitre at 20° C. as the basis of the scales of the standard hydrometers. The Laboratory has also co-operated with this sub-committee in the preparation of density-composition tables for various liquids. The standard density hydrometers and tables will provide a logical, scientific basis for hydrometry which should lead to much desirable simplification of industrial practice. The establishment of hydrometry on a simple density basis, with hydrometers indicating density in grammes per millilitre replacing the large variety of specific gravity hydrometers, arbitrary scale hydrometers such as Twaddle and Baumé, lactometers, salinometers, saccharometers, etc., would, it is considered, be of considerable benefit.

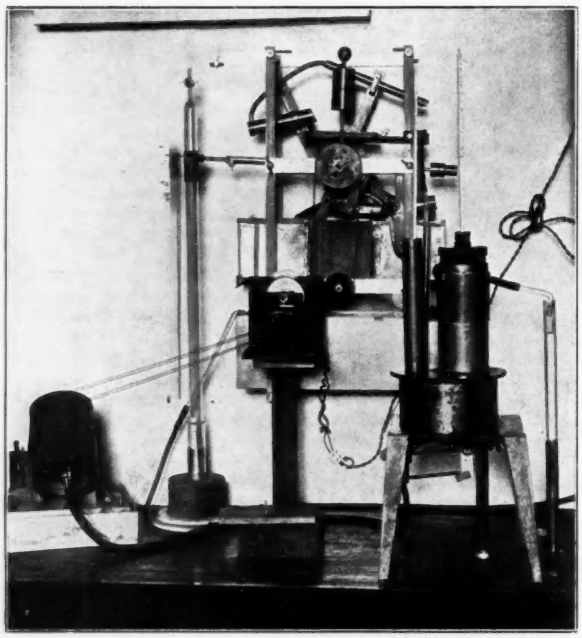
During the past year experiments have been carried out with mixtures of xylol (conforming to British Standard Specification No. 458, of 1932), and tetrachlorethane as standard liquids for testing hydrometers. The xylol has a density of 0.86 g per ml at 20° C., and tetrachlorethane 1.6 g per ml at 20° C. The liquids mix in all proportions, so that a series of liquids can be made up covering the above range of density, which are colourless and in which hydrometers can be read very conveniently. The liquids were chosen because they have a low surface tension which changes only slightly with density, and it was hoped that the surface tension would remain constant over reasonably long periods of time. Results of surface tension determinations indicate that mixtures of xylol and tetrachlorethane form a series of liquids well adapted for the intercomparison of hydrometers over the range 0.86 g per ml to 1.6 g per ml. For densities below 0.86 g. per ml. mixtures of petroleum ether and benzol are suitable. It is now proposed to investigate the suitability of mixtures of tetrachlorethane and ethylene dibromide (density 2.18 g. per ml. at 20° C.) for densities in the range 1.6 g. per ml. to 2.0 g. per ml. at 20° C.

Measurement of Calorific Value of Gases

Professor C. V. Boys Delivers the Guthrie Lecture of the Physical Society

THE annual Guthrie Lecture of the Physical Society was given at the Imperial College of Science and Technology on May 4, when Professor C. V. Boys described for the first time a new gas calorimeter which he has devised. Lord Rayleigh, the president, was in the chair, and recalled the fact that Professor Boys had been a member of the Society for 54 years and was president twenty years ago.

Professor Boys opened his lecture by remarking that he did not intend to say anything with regard to what other



The New Boys Calorimeter.

people had done in previous years in regard to gas calorimetry, except that the water flow gas calorimeter was invented and made in this country by Mr. Hartley, of the firm of Alexander Wright and Co., and that this invention was the basis of all efforts made with regard to the testing of gas. Coming to his own work, which was the subject of the lecture, not one word of what he was going to describe had so far escaped from his office in Victoria Street until the present occasion.

Some years ago he was not satisfied with the instrument known as the "Boys" calorimeter. He was not satisfied with the water flow calorimeter which he had introduced into his own recording calorimeter, although generally speaking there was not much the matter with it. He had, however, been endeavouring for the past ten years to make a water flow calorimeter of such a nature that he would not want to improve on it. It was about this time last year that he finally got an instrument with a calorimeter unit which satisfied him. Two things were required with a water flow calorimeter, namely, that the flow of water should be absolutely uniform, or that the flow of water should vary inversely as the volume occupied by the gas at the temperature and pressure at the moment. The first plan had been adopted in his existing recording gas calorimeter, but the second idea in his new instrument.

The small glass part incorporated—which took the form of a tube somewhat of a Z shape—at once fulfilled his idea of getting a flow of water varying inversely as the volume occupied by the gas at the temperature and pressure of the moment. The idea he had started with was to get something which would go on working continually for a hundred years without change and he believed he had now obtained it.

By the aid of slides Professor Boys showed the theroretical calculations by which he had arrived at this result and, as illustrating the type of accuracy obtained with it, he showed tables of figures indicating errors of the order of from 1 to 20 parts in 100,000. He also stated that the quantity of water required per annum for the purpose of this apparatus would not amount to more than a gallon or so of distilled water, as compared with something like 300,000 gal. of water, costing a considerable sum of money, in the case of existing instruments, a quantity which, he said, in a year such as the present was likely to be forbidden altogether. Moreover, in his new instrument there were, he claimed, no internal working parts, nothing to change, nothing to alter and nothing to wear out. The motive power was supplied by a small synchronous motor taken from a turret clock made by Everett Edgcumbe and Co., and though he admitted that this small motor was only just able to do the work, it had been operating night and day for a long time in the apparatus he had made and still continued to function successfully.

Letters to the Editor

The Editor welcomes expressions of opinion and fact from responsible persons for publication in these columns Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

Poor King Coal

SIR,—I was somewhat amazed by the editorial note under the above title in your issue of April 28. It seemed to be inspired either by some animus against the coal industry itself or by a desire—to put it bluntly—to grind a personal axe. I cannot agree, for instance, that the address of Mr. W. R. Gordon was only "a mass of crude statement, little more than a schoolboy's loosely strung essay on the uses of coal" which had "no public value." The public is sadly lacking in that kind of information which Mr. Gordon's address contained, and although it would have been perfectly easy to introduce a highly technical paper on any one of the many points of interest referred to by Mr. Gordon, it would have been quite impossible within the limits of such an address to treat them all in that fashion.

The Coal Utilisation Council, as the writer of the note admits, has undertaken a Herculean task and it is precisely a survey such as that given by Mr. Gordon which, so it seems to me, is so valuable and so much needed from time to time. The coal industry has often been criticised for not putting its house in order, for not paying sufficient attention to the disposal and scientific utilisation of its produce, for not doing this, that or the other. Now it has made a start, and all it gets from THE CHEMICAL AGE is more criticism. The Coal Utilisation Council has been in existence for little more than a year, but in that time a remarkable change of attitude is noticeable within the industry, and the programme which the Council has laid down for itself and which it is steadily carrying out, should have far-reaching and beneficient results. Let us therefore give it a little time—and encouragement—instead of adopting the contemptuous attitude of the writer of the note.—Yours faithfully,

SAMUEL INSTONE.

52-54 Leadenhall Street,
London, E.C.3.

The Duty on Fuel Oil

SIR,—The manufacturers of diesel engines who have publicly called upon the Chancellor of the Exchequer to remove the present tax upon imported fuel oil surely overlook the object of that tax. Its primary aim was to afford some small measure of protection and encouragement to the British coal industry. And, surely, if the respective claims upon national consideration of the coal industry and the comparatively small Diesel manufacturing industry are to be considered, the coal industry must come first; although, in view of this latest appeal, it is interesting to remember in an earlier memorandum to the Chancellor the interests of the two industries were properly regarded as parallel rather than divergent. It was then pleaded that one effect of untaxed fuel oil from British coal would be so to develop the Diesel engine industry as to capture other markets. Development has, in fact, been already carried out in countries where a tax has been imposed for years.

The present penny tax upon imported fuel oil is by no means prohibitive, but there can be no doubt about its vital importance to the coal industry. Recently, for instance, Mr. Evan Williams, president of the Mining Association of Great Britain, estimated that the tax has benefited the coal industry already to the extent of more than 600,000 tons a year. Our coal industry is by no means in a flourishing condition and retention of the tax is essential to maintenance of the present level of activity. The argument of the Diesel engine manufacturers would have greater force if there were no tax upon imported fuel oil elsewhere. But this there is. Probably Diesel engines are more widely used in Germany and Switzerland than in any other country. Yet both these countries tax imported Diesel oil. In Germany there is a tax of 17 marks per 100 kilos plus a turnover tax of 2 per cent. of the duty paid value. The Swiss tax is 3 francs per 100 kilos. This country cannot afford to sacrifice the interests of its basic coal industry to those of producers of foreign oil—not even to assist makers of Diesels. The present would be an especially inopportune time to attempt anything of the sort. Later it may be done without harm to the coal industry. Just now capital is being invested and much work is being done in the initial stages of producing oil from British coal. The early stages of this work are costly and the enterprises under way deserve all the encouragement they can be afforded. Later, when British oil-from-coal production is firmly established, our coal industry may be able to dispense with the present necessity for the penny tax.—Yours faithfully,

W. A. BRISTOW,
Chairman.
Low Temperature Coal Distillers Association of Great Britain, Ltd.

28 Grosvenor Place, S.W.1.

Preservation of Foodstuffs

Joint Visit to Campden Research Station

THE Bristol sections of the Institute of Chemistry and the Society of Chemical Industry, together with some members of the Birmingham sections, paid a visit to the Fruit and Vegetable Preservation Research Station at Campden, Glos., on May 12.

The work of this research station is concerned mainly with the British canning industry. A brief description of the problems studied in each department was given by Mr. Hirst, the director of research. It appears that little information on commercial practice in the canning of cream is available in this country, and experimental plant was recently installed at the research station for the study of dairy products. The principal channels of research carried out in the bacteriological department are investigations on heat resistant moulds; the spoilage of canned vegetables by thermophilic bacteria; bacteriological examination of home-produced sugar for thermophilic bacteria; and the examination of canned foods to ascertain the types of micro-organisms which survive normal sterilisation processes. In the biochemical department are being studied the changes in the starch content of peas during ripening, in which it has been shown that these changes are associated with loss of flavour and the development of a corny texture in over mature peas. The results obtained up to the present on six of the most widely grown varieties were shown.

The principal problems under investigation in the chemical department are the changes in composition of head-space gases in canned fruits during storage, the effect of hard water in the canning of fruits and vegetables, the causes of patchiness in the colour of canned strawberries and the internal rusting of plain cans. Apparatus in the physical department was designed and constructed at the research station to measure pressures, head-spaces in cans and to study problems connected with the straining and distortion of can seams. In connection with research and advisory work, approximately 12,000 cans were packed last year. The working of a small size commercial product was demonstrated in the canning of rhubarb. Extensive variety trials of both fruits and vegetables are carried out each year and new products and methods are being investigated.

IT is reported that the Brazilian Government is interested in the possibility of erecting three alcohol fuel-distilling plants, one each in Rio de Janeiro and Sao Paulo with a daily capacity of 60,000 litres, and one in Pernambuco with a daily output of 20,000 litres.

British Overseas Chemical Trade in April

Enormous Increase in Re-Exports

EXPORTS of chemicals, drugs, dyes and colours during the month ended April 30 were valued at £1,577,645, as compared with £1,492,150 for April, 1933, an increase of £85,495. Imports totalled £866,802, as compared with £807,364; re-exports were £353,570, as compared with £29,323.

Imports

	Quantities. April 1933.	Quantities. April 1934.	Value. April 1933. £	Value. April 1934. £
Acids—				
Acetic .. .. cwt.	16,587	17,084	28,678	26,726
Boric (boracic) ,,	700	2,818	678	2,774
Citric .. .. ,,	820	1,160	2,574	3,236
Tartaric .. ,,	1,275	4,252	4,584	17,703
All other sorts .. value	—	—	6,214	9,494
Calcium carbide .. cwt.	59,455	59,754	34,422	37,669
Potassium compounds—				
Caustic and lyes cwt.	6,919	9,504	9,143	11,151
Chloride (muriate) ,,	42,560	61,444	19,976	25,544
Kainite and other mineral potassium fertiliser salts, not elsewhere specified cwt.	96,093	167,250	16,619	28,052
Nitrate (saltpetre) ,,	7,315	5,675	6,189	5,104
Sulphate .. ,,	20,145	17,740	11,242	8,570
All other compounds ,,	7,719	9,658	11,706	14,852
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	28,537	475	8,709	171
Chromate and bichromate .. .. cwt.	2,798	4,051	4,159	5,613
Cyanide .. ,,	—	1,402	—	3,385
Nitrate .. .. ,,	20	48,801	3	10,491
All other compounds ,,	23,227	14,634	16,748	11,587
Other chemical manufactures .. .. value	—	—	200,193	189,879
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts ozs.	242,921	75,007	21,132	6,666
Medicinal salts, not elsewhere specified cwt.	3,042	3,009	7,281	6,929
Ointments and liniments	9	6	295	395
Proprietary medicines	—	—	22,929	25,930
Other manufactured sorts .. .. value	—	—	66,110	45,624
Raw or simply prepared value	—	—	24,716	50,547
Finished dyestuffs (coal tar) .. .. cwt.	3,321	3,781	77,062	93,689
Extracts for tanning—				
Chestnut .. cwt.	26,226	21,931	18,434	15,399
Quebracho .. ,,	103,737	125,483	57,252	71,879
All other sorts .. ,,	24,372	32,955	19,541	24,693
All other dyes and dyestuffs .. .. cwt.	4,080	6,192	10,879	15,794
Painters' colours and materials—				
White lead, basic carbonate .. .. cwt.	5,363	7,097	6,480	8,297
Lithopone .. ,,	16,144	23,052	11,243	15,078
Ochres and earth colours cwt.	24,176	25,319	8,945	10,083
Bronze powders ,,	3,300	1,381	13,674	9,458
Carbon blacks .. ,,	25,202	11,282	33,970	18,012
Other dry pigments and extenders .. cwt.	22,772	20,393	6,752	8,163
All other descriptions ,,	8,690	12,936	18,832	28,075
Total .. .. value	—	—	807,364	866,802

Exports

	Quantities. April 1933.	Quantities. April 1934.	Value. April 1933. £	Value. April 1934. £
Acids—				
Citric .. .. cwt.	3,327	3,968	10,167	10,772
All other sorts .. value	—	—	13,698	22,308
Aluminium compounds tons	1,533	1,790	13,633	20,438
Ammonium sulphate ,,	23,613	20,389	139,584	122,025
Other ammonium compounds .. .. tons	815	1,028	12,811	13,999
Bleaching powder (chloride of lime) .. .. cwt.	57,735	53,003	15,549	14,413
Tar oil, creosote oil, etc. gal.	3,025,976	5,558,397	43,169	86,573
Other coal tar products	—	—	28,952	23,471
Copper, sulphate of tons	6,504	4,906	92,605	68,434
Disinfectants, insecticides cwt.	26,346	30,525	58,852	66,503
Glycerine .. .. ,,	6,540	10,976	12,293	23,596
Lead compounds .. ,,	13,626	12,279	15,790	14,727
Magnesium compounds tons	382	420	9,936	10,179
Potassium compounds cwt.	4,908	6,985	13,224	16,970
Salt (sodium chloride) tons	28,837	18,811	88,049	54,053
Sodium carbonate, including ash and bicarbonate cwt.	288,518	354,922	71,981	87,204
Caustic soda .. cwt.	166,011	143,980	115,448	91,618
Other sodium compounds	85,948	83,777	63,389	72,426
Zinc oxide .. tons	874	810	16,865	16,138
All other descriptions	—	—	159,409	189,955
Drugs, medicines and medicinal preparations—				
Quinine and quinine salts oz.	75,634	44,871	7,801	4,880
Proprietary medicines	—	—	88,822	85,940
All other descriptions ,,	—	—	102,693	127,410
Dyes and dyestuffs and extracts for dyeing tanning—				
Alizarine and indigo (synthetic) .. cwt.	1,272	1,782	9,546	13,021
Other finished dyestuffs obtained from coal tar .. .. cwt.	7,149	5,348	66,477	70,964
All other descriptions ,,	13,611	20,889	17,921	29,179
Painters' colours and materials—				
Other dry pigments and extenders .. cwt.	11,173	13,933	13,320	18,981
Ochres and earth colours	11,946	21,195	12,070	16,849
White lead .. ,,	4,806	6,042	9,074	11,139
Paints and painters' enamels, ready-mixed cwt.	26,949	36,458	80,049	94,139
Varnish and lacquer gal.	59,328	75,444	25,543	30,368
All other descriptions ,,	31,284	21,695	63,430	48,973
Total of painters' materials, not elsewhere specified .. cwt.	91,102	105,610	203,486	220,449
Total .. .. value	—	—	1,492,150	1,577,645

Re-Exports

	Quantities. April 1933.	Quantities. April 1934.	Value. April 1933. £	Value. April 1934. £
Chemical manufactures and products .. value	—	—	11,106	313,734
Drugs, medicines and medicinal preparations—				
Manufactured or prepared .. value	—	—	8,241	21,577
Raw or simply prepared value	—	—	7,806	15,662
Dyes and dyestuffs cwt.	884	563	1,650	2,090
Dyes and dyestuffs and extracts for dyeing and tanning .. .. cwt.	884	563	1,650	2,090
Painters' colours and materials .. .. cwt.	172	295	610	507
Total .. .. value	—	—	29,323	353,570

Solving a Works Dust Collection Problem

Removing and Recovering Fine Dust from Large Volumes of Air

A GREAT variety of industries produce during their manufacturing processes large quantities of fine or coarse dust which must be collected to safeguard the health of the workers, and prevent nuisance and damage to adjacent machinery and surrounding property. In other cases the dust is valuable and its collection becomes an economic necessity.

The choice of a suitable dust collector is mainly dependent on the nature and size of the dust, and whether the highest possible efficiency is aimed at, irrespective of first cost or whether the latter point is of importance. For coarse material containing a small percentage of fines only, such as sawdust, leather, etc., an ordinary settling chamber gives quite satisfactory results, but as it occupies a considerable amount of space an orthodox cyclone separator is preferable. This type of dust collector is, however, not good enough for the efficient collection of very fine dust, especially where very large volumes of air have to be dealt with. In that case an automatic bag type dust collector is really the only solution. With the "Visco-Beth" dust collector, supplied by the Visco Engineering Co., Ltd., the dust-laden air, or gas, is drawn by a suitable exhauster through a number of cloth tubes, arranged in compartments, which retain the dust whilst the cleaned air is discharged to atmosphere or directly into the building. The dust, moreover, is periodically and automatically shaken off and at the same time blown off the filter tubes by a mechanical shaking gear and a separate positive supply of clean "scavenging" air. This combination keeps the filter efficiency constant and prevents choking of the tubes with consequent failure of the plant, the more as the quantity and pressure of the scavenging air can be suited to the specific nature of the dust. Where the air or gases are highly charged with moisture the scavenging air is preheated to prevent condensation in the casing and the tubes.

The Visco-Beth dust collector is entirely automatic and beyond the occasional lubrication of bearings it requires no attention. A separate and positive supply of scavenging air effectually cleans and preserves the filter tube efficiency. The efficiency is not affected by the moisture content of the air, and the dust is collected in a dry state. The efficiency, moreover, is claimed to be nearly 100 per cent. and a firm guarantee is given for every installation. The capacity of the unit is also larger than that of other types of dust collectors; in other words, the Visco-Beth unit occupies less space.

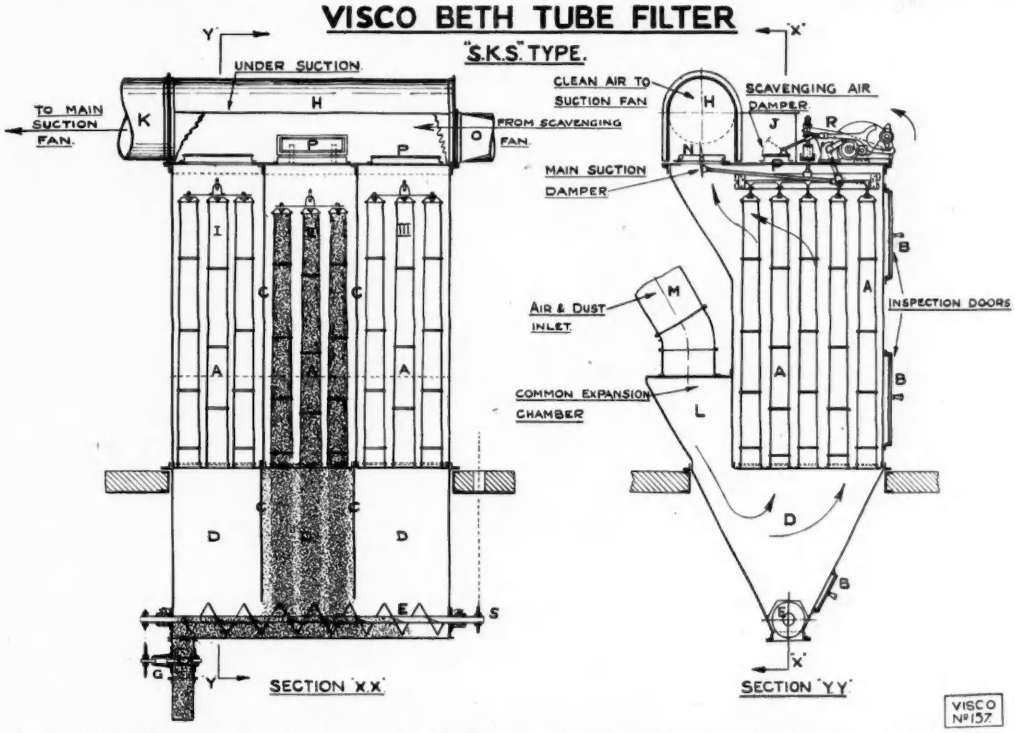


Fig. 1.—Sectional Drawing of a typical Suction Type Dust Collector with 45 Filter Tubes, grouped in three units of 15 tubes each.

The accompanying diagram (Fig. 1) shows in section a typical suction type dust collector with 45 filter tubes, grouped in three units of 15 tubes each. Each group is separated from

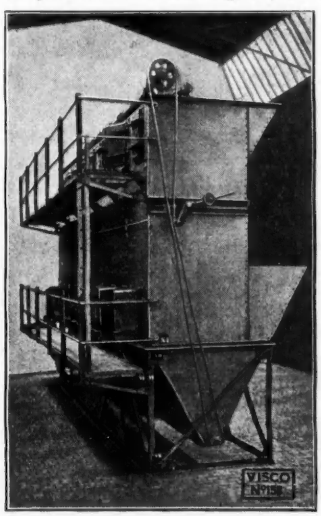


Fig. 2.—A large Dust Collector erected and undergoing running tests previous to shipment to Hong Kong.

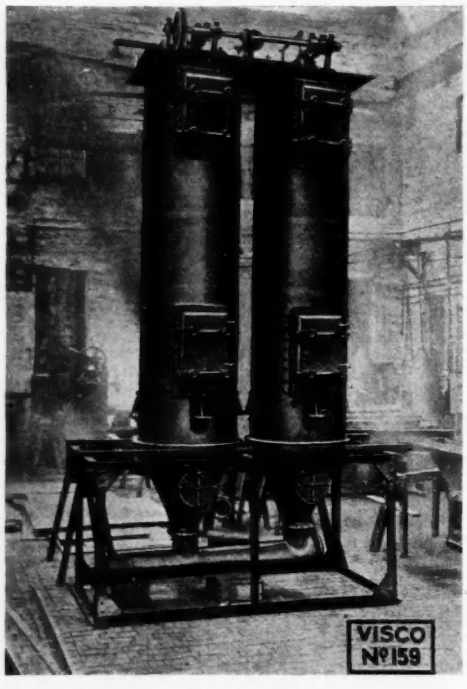


Fig. 3.—Cylindrical Units combined in one installation with common Operating Gear.

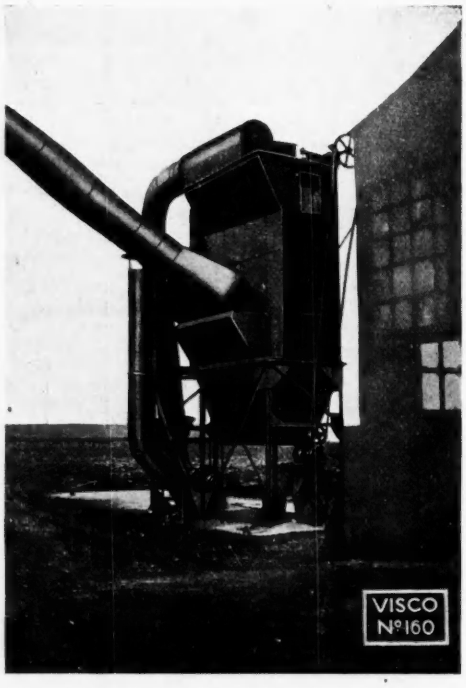


Fig. 4.—A "Visco-Beth" plant dealing with Zinc Oxide Fumes from Brass Smelting Furnaces.

its neighbour by division plate "C" continued below the tube plate into hopper "D." This hopper is fitted with spiral conveyor "E" and rotary dust gate "G," the latter providing a dust-tight connection to the atmosphere. On top of the dust collector casing is mounted the gear "R" for closing and opening the air admission gates "N" and for shaking filter tubes "A," as well as header "H" for the cleaned air and header "J" for distributing the scavenging air. Suction is created by a suitable centrifugal fan (not shown), connected to the filter by duct "K."

The dust-laden air enters the dust collector by duct "M" into the expansion chamber "L," thence into hopper "D" where all heavy dust is deposited, the air then passing into the inside of the tubes from below. These tubes are made of

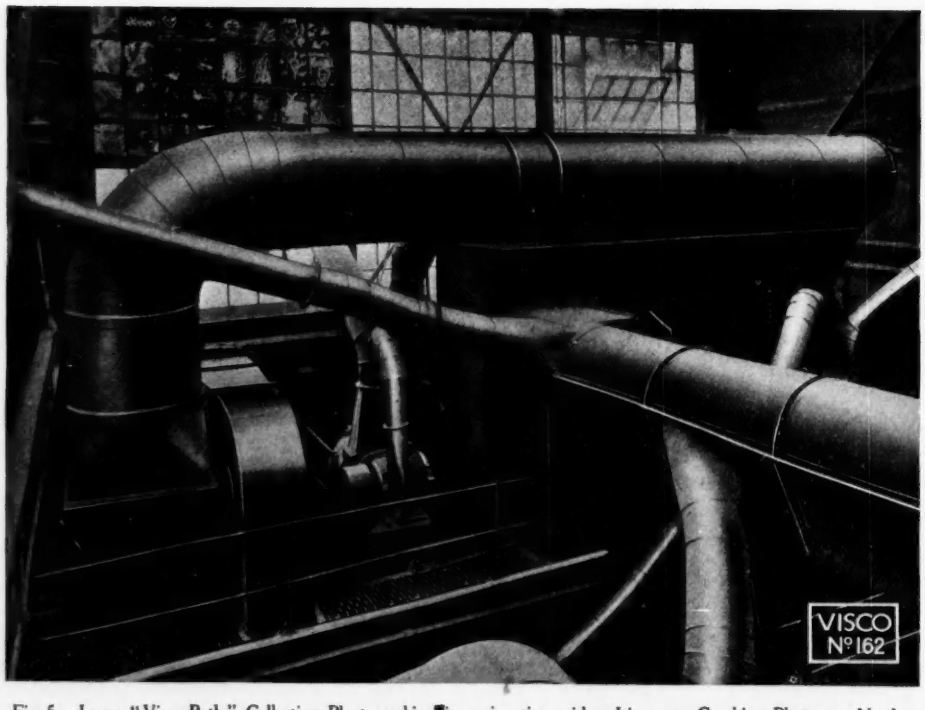


Fig. 5.—Large "Visco-Beth" Collecting Plant working in conjunction with a Limestone Crushing Plant at a North East Coast Chemical Works.

heavy cloth and of a texture to suit the nature of the dust to be dealt with. The dust is deposited on the inner surfaces of the tubes, whilst the cleaned air leaves through gates " N " via the main suction fan to atmosphere.

The scavenging air moves in the opposite direction and is delivered to the dust collector by a separate centrifugal fan (not shown), through inlet duct " O," header " J " and valves " P." By passing from the outside to the inside of the tubes, the latter are freed from the deposited dust, which is carried by the air stream, into hopper " D," whence it is removed by spiral conveyor " E." The scavenging air, after entering hopper " D," is diverted into expansion chamber " L " where it mixes with the main air volume. The valves " N " controlling the clean air suction and gates " P " controlling the admission of scavenging air are opened and closed automatically by the top operating gear " R." As soon as the scavenging air enters one compartment the shaking gear is automatically started to assist the cleaning operation. The groups forming one filter are cleaned in rotation.

The interval between and the duration of the cleaning operation depends upon the nature and quantity of the air borne dust and can be adjusted accordingly.

Negligible Power Requirements

The power required for driving the operating and shaking gear is practically negligible. Generally the top gearing is belt-driven from pulley on main suction or scavenging air fan shaft, spiral " E " being operated by chain " S " from top gearing. The casing of the dust collector is usually made in sheet iron, but in some cases, as for instance, for flour and light chemicals, in wood. Ample inspection doors are provided to facilitate the inspection and changing of tubes.

For very small installations and in cases where the main fan operates under a high suction, the scavenging fan can be dispensed with. For balanced operation under such conditions, as for instance in connection with pneumatic conveying plant and Visco industrial vacuum cleaners, the casing is made in cylindrical form, a number of such units being combined in one installation with common operating gear (Fig. 3). When the plant is not in continuous operation and first cost is of prime importance, these dust collectors can be provided with hand operated shaking gear.

From the description given it will be evident that the Visco-Beth dust collector will satisfy very exacting demands. One particular instance is found in the cleaning, drying and pulverising of coal, where large volumes of fine dust laden air have to be handled and filtered before they can be allowed to return to the atmosphere. Visco-Beth plants also deal with the exhaust gases from coal driers, dry coal cooling plants, pulverising mills, and coal bins. In all cases at least 99 per cent. of the coal dust in suspension is recovered dry.

In the plastics trade and the production of gramophone records, " Visco-Beth " collectors are also doing very good work. The flue ash problem also finds a complete solution in the " Visco-Beth " dust collector if a perfect elimination is desired providing always that the gases can be cooled sufficiently so as not to damage the filter tubes.

Dust in Cement Factories

There is hardly another industry where more dust is created than cement factories. It has been shown that with inefficient collection as much as 5 per cent. of the total production has been lost, and that the capacity of the mills can be greatly increased with intensive ventilation. For cement factories " Visco-Beth " dust collectors have for years been used in connection with coal drying and pulverising plants, kiln exhausts, conveyors, silos and cement packing plants (Fig. 2), shows a large dust collector erected and undergoing running tests at the makers' works previous to shipment to Hong Kong. It works in connection with " fine " mills, a similar installation having been supplied for the same cement works, in connection with bag filling and packing plant.

The fumes from lead, copper, tin and zinc smelting works contains considerable quantities of metal in finest form. After suitably cooling the gases with metallic dust is almost completely collected by the " Visco-Beth " collector. Fig. 4 shows a " Visco-Beth " plant dealing with zinc oxide fumes from brass smelting furnaces. The gases are cooled in an air heater, the heated air being used for warming some of the shops.

Post-War Children on the Dole

Unemployed Figures Down Again

THE unemployment figures, at 2,148,000, are really 71,000 better than a month ago. The returns show that the numbers of those without work are 53,382 down as compared with March, 1934, but this calculation allows for the appearance on the register of 21,000 more children. " The Independent," of May 12 points out that " the exceptional birth-rate of the first quarter of 1920 has had its sequel in an increase in the number of children leaving school last term. Now 21,000 of these children rank among the unemployed. They will be the subject of differences of opinion. Some will rejoice that having finished their education, for what that is worth, they will be able straightway to experience the benefits of our unemployment arrangements. Others will deplore the thought that 21,000 young folk, with the problems of life and all its interests and difficulties ahead of them, should start their careers not looking to themselves, not relying on their parents, not seeking the advice and assistance of friends, but with both hands in the public purse."

The Institute of Chemistry

April Examination Results

THE Institute of Chemistry has issued the pass list for the April examinations, as follows:—

Examination in general chemistry for the associateship: Leslie Billington, A.M.C.T., College of Technology, Manchester; Charles Sandell Farmer, A.M.C.T., College of Technology, Manchester; Saxon Archibald Gerrard, A.M.C.T., College of Technology, Manchester; David Noel Grindley, Central Technical School, Liverpool; Miss Olga Muriel Hands, Regent Street Polytechnic; Richard Henry Henriksen, Central Technical School, Liverpool; George Harold James, Technical College, Derby; Harold Britnor Lunn, A.M.C.T., College of Technology, Manchester; Andrew Muir, Royal Technical College, Glasgow; John Edward Nightingale, B.Sc. (Lond.), A.R.C.S., Royal College of Science, London; William Pollard, A.M.C.T., College of Technology, Manchester; Albert Edward Rickwood, B.Sc. (Lond.), Sir John Cass Technical Institute, and Woolwich Polytechnic, London; Harold Sagar, A.M.C.T., College of Technology, Manchester; William John Shanks, A.M.C.T., College of Technology, Manchester; Herbert John Spriggs, B.Sc. (Lond.), University College, and Birkbeck College, London; Claude Lawson Stratford, A.M.C.T., College of Technology, Manchester; Leslie George Tomlinson, B.Sc. (Lond.), Technical College, Derby, and Central Technical College, Birmingham; Geoffrey Walley, B.Sc. (Lond.), Central Technical School, Liverpool; Frederick Walsh, A.M.C.T., College of Technology, Manchester; John Wharton, Central Technical School, Liverpool; Wilfred Arthur Stephen White, B.Sc. (Lond.), Municipal College of Technology, Belfast; Robert Allen Wright, A.M.C.T., College of Technology, Manchester.

Examinations for the fellowship: Branch A: Inorganic chemistry: Clifford Chew, M.Sc., Tech. (Manc.); Branch C: Organic chemistry, with special reference to oils and fats: George Frederick Longman, B.Sc. (Lond.); William Henry Sleep, B.Sc. (Lond.); Branch E: The chemistry, including microscopy, of food and drugs, and of water: Lester Albert Hathaway, B.Sc. (Lond.); Raymond Mallinder, B.Sc. (Lond.); William Wilders Taylor, B.Sc. (Lond.); Kenneth Alan Williams, B.Sc. (Lond.).

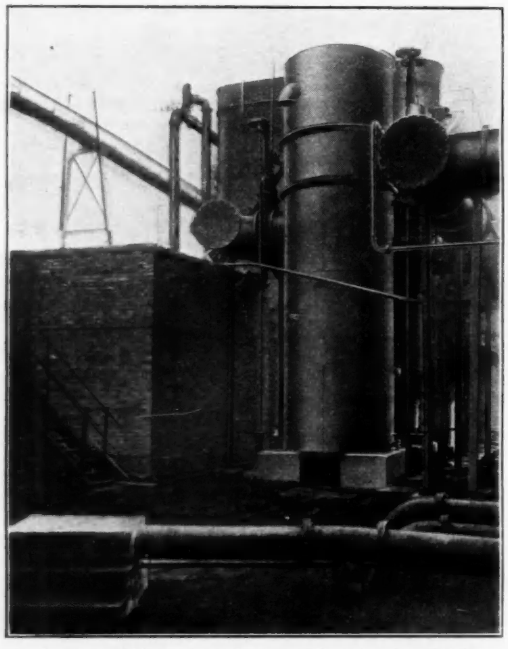
Special examinations: Chemistry and biology of water supply: Gilbert Underwood Houghton, M.Sc. (Lond.) Chemistry of oils, paints and varnishes: Henry Wilfrid Keenan.

IT is anticipated that considerable extensions will be made to the plant at the South African Carbide and By-Products factory, at Ballengeich, Natal.

Works Equipment News

Improved Tar Separation from Gases

IN the carbonisation, town's gas, by-product metallurgical coke and low temperature carbonisation industries, the efficient removal of tar particles has been a difficult problem. The air and water cooling of the condensers, of course, results in the separation of the bulk of the tar and liquor, but a considerable amount of finely divided tar particles still has to be removed before scrubbing for light oil and removal of sulphur compounds can be undertaken. The older methods in vogue for dealing with tar particles originated many years



Lodge-Cottrell Electrostatic De-tarring Plant handling 750,000 cu. ft. of Coke Oven Gas per hour with 99.7 per cent. separation.

ago, are the "P and A" separator, operating on the "inertia" principle, and the "Livesey" washer, in which the gas is bubbled through water against a back pressure. These methods, however, do not remove all the finer tar particles, whilst having other disadvantages, including back pressure, up to 5 inches W.G., tendency to emulsification of the tar, and fairly high maintenance and operating costs.

In this connection the value of the "Lodge-Cottrell" electrostatic method of treating carbonisation and other gases is now being generally realised. One of the main advantages is the very high efficiency of the tar removal. When carried out on the more usual lines, with the gases cooled to, say, 77-86° F. after passing the primary and secondary condensers, the efficiency is not less than 99 per cent. in actual continuous performance, much superior to any other method. A number of electrostatic plants are operating in the United States on coke oven gas and the standard performance guarantee is 99 per cent. removal, plus or minus 1 per cent., involving also the removal of water particles. The back pressure is negligible, about $\frac{1}{8}$ in., and the saving in fan power compared with other methods is often more than the total power required to operate the electrostatic method. Also the complete removal of the tar (99 per cent.) prevents all kinds of troubles in plant operation, improves the colour of the sulphate of ammonia, and, what is of special importance, prevents thickening of the gas oil used in scrubbing for light oil, the latter alone involving a considerable economy. All the familiar troubles of oxide of iron purifiers due to fine particles of tar in the gas are also eliminated, while the bulk of the tar separated by electrostatic methods shows no trace of emulsification and separates from water almost immediately. If necessary, however, electrostatic "hot detarring" can be carried out, treating the gas at, say, 176° F. (80° C.) from the primary cooler, such as for the direct production of a road tar without distillation.

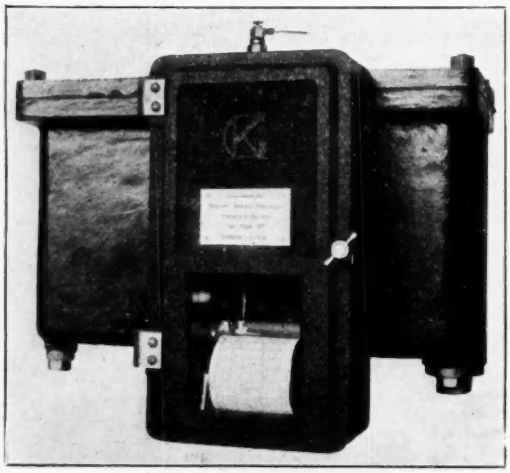
The basic principle of the "Lodge-Cottrell" system is the use of plates or pipes, constituting a series of earthed collector electrodes. In the narrow spaces between these plates, or in the pipes, hang wires or rods with numerous points, forming discharge electrodes, which are coupled to very high tension direct current supply at 60,000-70,000 volts, so that brush discharge takes place. As a result the dust particles in the gases which pass through the ducts or pipes, are electrified, and repelled against the earthed collector electrodes, which are equipped with motor driven rapping hammers.

Plant of this type, as supplied by Lodge-Cottrell, Ltd., is also being used extensively for many other applications, including, for example, blast furnace gas, metallurgical and ore roasting furnaces of all kinds, cement manufacture, producer gas, and the removal of dust from chimney gases, especially in the case of pulverised fuel firing.

Automatic Specific Gravity Recorders

A CONTINUOUS record of the specific gravity of oil flowing in pipe lines, including automatic correction for any variations in the temperature of the oil so that the specific gravity figure is reduced to a standard temperature, can now be obtained with a specific gravity recorder supplied by George Kent, Ltd. This instrument operates with an orifice fixed in the pipe line, on the same principles as used for metering of liquids and gases. The differential pressure is employed to create a flow of oil through the recorder which is situated alongside the orifice fitting.

Contained in the meter, which is of a rectangular shape with removable cover attached by bolts, is a displacer floating



Automatic Specific Gravity Recorder.

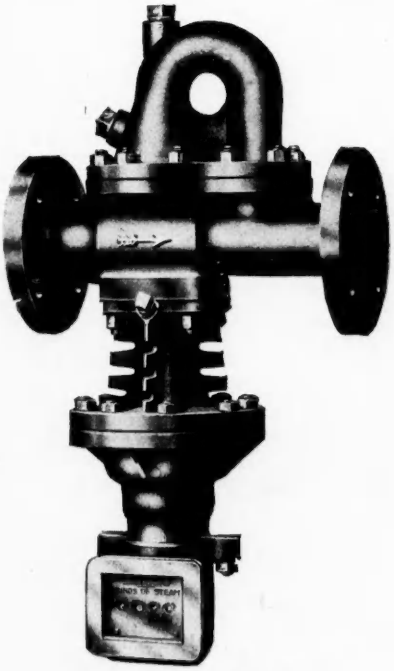
in the flow of oil, which is balanced about a knife edge by a weight and controlled by a pendulum weight. Included is a central chamber which connects by a pipe to the displacer, the latter being completely filled with oil, while the chamber is only partially filled. If there is a change in the specific gravity of the oil the displacer rises or falls accordingly, and by a suitable mechanism which operates on the magnetic principle, this movement is recorded by means of a pen upon a chart wrapped round a drum. The movement of the pen on the chart has a maximum range of 3 in. and one-tenth travel of the pen represents a change in specific gravity of

0.001, although the range of recording can be supplied to suit the particular requirements of the installation. If the temperature of the oil varies, the volume in the displacer expands and the surplus falls into the central chamber, and consequently the weight of the displacer is decreased by exactly the same amount.

Normally these Kent specific gravity recorders are supplied for working temperatures as high as 300° F. (150° C.) and for pressures up to 50 feet head, but for special conditions instruments can be supplied for almost any pressure or temperature. The dimensions of the meter casing are 3 ft. 4 in. by 2 ft. 6 in. by 2 ft. 4 in., corresponding to approximately 20 cubic feet and forming a very neat and compact arrangement, while the recording mechanism is contained in a locked case with glass front for reading the specific gravity curve on the chart.

Shunt Steam Meters

THE shunt steam meter illustrated is supplied by George Kent, Ltd., in standard sizes for 2, 3 and 4 in. diameter pipes, and is cheap and easy to install. Under average conditions the accuracy is plus or minus 2 per cent., even with a rapidly fluctuating demand, and this is a peculiarly valuable property. The meter is specially intended to fulfil the



Kent's Shunt Steam Meter.

important requirements of a simple yet accurate instrument for small bore pipes, merely fixed direct in the pipe line, like a valve, being 12 in. between the flanges, with easy and direct reading of the amount of steam by means of a series of dials.

At each end of the meter is a flange and inside is an orifice, being a metal disc of smaller diameter than the pipe. The steam partly flows through this disc and partly through a small shunt or by-pass pipe at the top of the meter, and the latter proportion of the volume, which of course rejoins the main pipe without going through the disc, actuates a small vertical turbine wheel, the speed of which corresponds to the amount of steam passing. The latter is read off in lb. of steam per hour or other suitable unit, on a dial face, the arrangement consisting of a vertical spindle attached to the turbine wheel which passes down through a closed chamber always filled with water condensed from the steam, the casing having on the outside a series of cooling fins. In this closed water chamber the turbine spindle has a series of paddles attached, forming a "damping fan" thus reducing the speed by the friction of the water, and is also connected to a reduction train of wheels. The actual drive to the counter is given by means of a magnet which actuates, without direct contact, another adjoining magnet on the counter spindle which is in a separate compartment, not exposed, therefore, to any leakage of steam or water.

Each instrument, as supplied, is calibrated for the given approximate average steam pressure in the pipe line, and as regards accuracy a variation of, say, 5 lb. per sq. in. pressure causes an error of only about 2 per cent. which can, however, if necessary be obviated by using a table of corrective factors supplied. Further, the meter measures the flow accurately to one-tenth of the maximum flow for which it is rated and, for example, in the case of a 2 in. meter for steam at 150 lb. per sq. in. the maximum rating may be chosen between 610 and 6,100 lb. of steam per hour, the figures, of course, varying with the pressure used, while overloads up to 100 per cent. are accurately registered and will not damage the meter.

Diesel Engine Repair Service

RAPID growth in the use of Diesel engines is necessitating a new technique in maintenance and repair. Higher working pressures with proportionately increased bearing loads call for skilful fitting work, together with a special knowledge of the particular problems connected with an oil burning power unit. Rather than risk the danger of unskilled handling, Diesel motors are returned for repair to the manufacturers or their nearest repair depot in frequent instances, a procedure which often implies undesirable delay. In order to ensure the facilities of an operating staff fully skilled in operating oil engines, Barimar, Ltd., now have a department to deal with this class of work in particular. Operations such as fitting the new Barimar non-corrosive liner, regrinding cylinder bores, renewing valve seats, re-metalling bearings and boring in line, the repair by scientific welding of fractured parts, etc., can be handled with despatch. This service is the result of numerous requests for special attention, and so extensive has the work of this department become already that recently marine Diesel engines of quite large siz have been received for attention in addition to road vehicle power plant.

The Institute of Physics

Sir Henry Lyon's Presidential Address

THE annual meeting of the Institute of Physics was held at the Royal Institution, on May 15. After the election of the officers and completion of the panel of the board, it was announced that the following would take office on October 1: President, Sir Henry Lyons; vice-president, Professor W. L. Bragg; hon. treasurer, Major C. E. S. Phillips; hon. secretary, Professor J. A. Crowther; members of the board, Dr. Allan Ferguson and Mr. R. S. Whipple. The annual report showed that the Institute had still further increased in standing and influence. The high standard for corporate membership had been well maintained and an increase of membership was recorded which was more than three times the average increase for the past ten years.

The activities of the Institute and its local sections, at home and abroad, had continued to prosper. An important development set on foot during 1933 was the scheme for the training of laboratory assistants, and the issuing of certificates of competence in laboratory arts, particulars of which have now been published.

Sir HENRY LYONS, in his presidential address, said that the Institute, through a special committee, had done good work in locating pieces of physical apparatus which were of special historical importance, and ensuring so far as possible that they should be preserved from deterioration or possible loss. Although physical science was advancing with extraordinary rapidity the history of its development merited attention and if the records of it were not preserved as occasion occurred, they were lost for ever. To construct such a history, he said, we had voluminous written records of that which had been achieved in the past from time to time, but the concrete milestones of the road which had been traversed in the form of instruments and apparatus had a peculiar interest to-day. Most examples known to-day dated from the eighteenth and nineteenth centuries and from earlier times they had only come down to us in rare and isolated cases.

News from the Allied Industries

Iron and Steel

THE FIRST NEW BLAST FURNACE at the Corby Works of Stewarts and Lloyds, Ltd., was lighted on May 8, by the chairman's youngest daughter, Miss Elspeth Macdiarmid, in the presence of the directors, the principal officials, the engineers (H. A. Brassert and Co.), and a small party of friends. This furnace is the first unit of its type, in Britain, embodying all the latest improvements. The somewhat larger No. 2 blast furnace will be started in the autumn, and these two units will furnish the iron for the new Corby Steel Works which will manufacture steel by the basic-Bessemer process. This quality of steel has been and is now imported in large quantities from the Continent, and its manufacture at home by British labour from native ores and coals mined by British labour is an important step in the national reconstruction of the iron and steel industry.

Tanning Industry

THE CHROME LEATHER TRADE continues to be very busy and the production of calf and side leathers is being maintained at its highest level. The imports of full chrome upper leathers from gold standard countries has fallen to such an extent that one Dutch firm who formerly had considerable business in England have purchased the Nene Valley Tanning Co.'s factory at Irthlington, Northants, and hope to commence manufacturing in the course of a few weeks. Most of the glazed kid manufacturers continue to be busy, but other sections of the trade are rather quiet. Fancy leather manufacturers are sampling for the winter trade and no doubt they will soon be getting busy again. Manufacturers are busy sampling fleece leathers which proved so popular last winter and it seems likely that there will be a boomlet in dyed fleece leathers for slippers next fall. The sole leather trade is somewhat quiet and the demand is all for cheap material. To meet this requirement, some leather manufacturers are resorting to the old practice of doping the leather with a mixture of glucose, magnesium sulphate or other deliquescent salt in order to maintan the colour and weight. Bookbinding leather manufacturers are incorporating salts of organic acids, particularly citric and tartaric, with their leathers in order to prevent deterioration. This practice is recommended by the British Leather Manufacturers' Research Association as a result of many years' investigation into this problem.

Starch

A COMPANY HAS BEEN FORMED, under the name of The British Farina and Dextrine Co., Ltd., for the purpose of erecting and operating mills near March, in the Isle of Ely, for the manufacture and distribution of farina and dextrine. Both products, directly derived from potatoes, are used in this country to the extent of about 125,000 tons per annum. The mills at March are being designed for an output of 14,500 tons of dextrine, which will necessitate the use of about 75,000 tons of potatoes per annum. The mills and plant will cost about £120,000, and will be run continuously in three shifts with local labour.

Oil Seeds and Oil Cakes

AN EXTRAORDINARY GENERAL MEETING of the British Oil and Cake Mills, Ltd., is to be held on June 1 for the purpose of considering a resolution to convert the shares in the company into stock. The chairman, in his speech at the annual general meeting on March 26 last, foreshadowed this proposal, the object of which is to obviate the necessity for using distinctive numbers which is the cause of a considerable amount of work and expense. The change will in no way affect the rights of any shareholder. Should the resolution be passed, the directors propose to fix £1 as the minimum amount of stock which can be transferred and to direct that fractions of £1 shall not be dealt with.

SPEAKING AT A MEETING of the United Premier Oil and Cake Co., Ltd., in London, on May 10, Mr. H. Guedalla, the chairman, said trading conditions during the year had been most difficult, and this refers more especially to the crushing side of our business. Linseed is one of the chief commodities in which the company deals, and as a result of the Ottawa Conference a duty of 10 per cent. was put on imported linseed of other than Empire origin. At the same time, the duty on linseed oil was increased from 10 per cent. to 15 per cent., but having regard to the duty on linseed this was manifestly insufficient to meet foreign competition. In May the duty on linseed oil was increased to £3 10s. per ton, but this again was far from satisfactory as it hardly meets the extra expense of the duty on imported foreign linseed. In fact, as far as trade in this particular commodity is concerned, the company has not derived any advantage from these counter-vailing duties.

Continental Chemical Notes

ITALY HEADED THE WORLD'S PRODUCTION of copper sulphate in 1933 with an output of over 100,000 tons, against 99,000 tons in the previous year.

* * *

THE POLISH POTASH CONCERN "Tesp," is reported to have opened sales depôts in the principal towns of that country. The new sulphate fertiliser (Kalimag), based upon potassium sulphate, is only being produced for the present on an experimental scale.

* * *

STATISTICS RELATING TO SPANISH CHEMICAL PRODUCTION in 1932 show that the heavy chemical industry was mainly represented by calcium chloride, calcium carbide, calcined soda, copper sulphate and sodium sulphate. Among coal tar products, creosote and naphthaline were produced on a moderate scale.

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THE CONCORDIA COLLIERY, of Oberhausen, is reported in the "Chemiker-Zeitung" to be operating a dry process for desulphurisation of coke-oven gas which makes but a small demand on space and offers a convenient method for the isolation of crude sulphur. It is based upon the use of specially prepared ferric hydroxide spheres of 15 to 20 mm. diameter, possessing great mechanical strength and a comparatively high porosity (equivalent to about 60 per cent. by volume).

NATURAL DYESTUFFS FOR COTTON AND SILK are being extracted on a considerable scale at a new factory at Batoum, principally from mulberry and chestnut trees.

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TWO NEW PHOSPATE FERTILISERS have been introduced by the Czecho-Slovakian Nitrogen Works, Marienburg, the one containing 30 per cent. soluble phosphoric acid and 18 per cent. active potash, and the other 16 per cent. phosphoric acid, 11 per cent. nitrogen and 16 per cent. lime.

Society of Chemical Industry

Manchester Section : New Officers for 1934-35

THE officers and the new members of the committee of the Manchester Section of the Society of Chemical Industry for the session 1934-35 have been elected as follows: Chairman, Dr. A. Schedler; vice-chairman, Mr. A. McCulloch; hon. secretary and treasurer, Dr. W. H. Brindley; hon. assistant secretary, Mr. H. Shaw; hon. auditors, Dr. M. Barash and Dr. A. Geake; committee, Dr. T. Callan, Mr. W. Cowen, Mr. C. J. T. Cronshaw, Mr. F. D. Farrow, Mr. J. R. Hannay, and Professor I. M. Heilbron, F.R.S.; Chemical Engineering Group representative, Mr. H. Cheetham; Food Group representative, Mr. H. Shaw.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

QUOTATIONS have remained practically unchanged and business in most sections of the chemical market has been on a moderate scale. Fair interest is being shown in a number of industrial products and prices are steady. Acetone, formaldehyde, formic and oxalic acids and salamoniac are in good demand, and satisfactory business is being transacted in acetic acid, anhydrous ammonia, ammonium chloride, potassium chlorate and saltcake. The potassium carbonate marget has been a little more active and an improved demand for caustic potash has continued. Heavy solvent naphtha and pitch are still dull items in the coal tar products market, and sales of toluol and xylol are not satisfactory. The demand for cresylic acid shows a distinct improvement and considerable interest is still being shown in creosote oil. The tone of the pharmaceutical chemical market is steady. The best demand has been for aspirin, benzoic acid, bromides, hexamine and phenacetin, and there has been rather more inquiry for sodium salicylate. The essential oils market has shown some improvement, but little interest is being shown in certain items.

LONDON.—There are practically no changes to report, as prices still remain steady with a good demand. The coal tar products market remains firm and with the exception of a slight variation in pitch prices are unchanged from last week.

MANCHESTER.—Although deliveries of general chemicals against contracts during the past week have been pretty well maintained in this district, a marked falling away in this respect is looked for during next week in consequence of the Whitsun holidays, which will be on a fairly extensive scale in Lancashire and East Yorkshire, and instructions to suspend deliveries are already circulating. Meanwhile, buying this week has been mostly in respect of near delivery dates and not many new forward contracts of any consequence have been reported. Continued weakness in the lead market is exerting its influence upon the lead compounds, although, on the other hand, a recovery in copper on balance has improved the undertone to some extent in the case of sulphate. Except for one or two isolated movements values of chemicals have remained steady to firm, and in the case of the by-products also changes have been small, the falling tendency in the light materials having apparently come to an end for the time being.

SOTLAND.—Business continues steady in the Scottish heavy chemical market.

General Chemicals

ACETONE.—LONDON : £65 to £68 per ton; SCOTLAND : £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80% £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON : Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND : Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER : 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Granulated commercial, £26 10s. per ton; powder, £28 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON : 9½d. per lb.; less 5%. MANCHESTER : 9½d.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON : £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND : Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE : Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND : 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON : £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND : 98/100%, £48 to £50 ex store. MANCHESTER : £48 10s. to £53 ex store.

ACID, SULPHURIC.—SCOTLAND : 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON : 1s. per lb. SCOTLAND : B.P. crystals, 11d., carriage paid. MANCHESTER : 1s. 0½d.

ALUM.—SCOTLAND : Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON : £7 10s. to £8 per ton. SCOTLAND : £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND : 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND : 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND : Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON : Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND : British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND : Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON : £16 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND : White powdered, £23 ex wharf. MANCHESTER : White powdered Cornish, £21 ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BARYTES.—£7 to £8 10s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND : £8 in 5/6 cwt. casks for contracts over 1934/1935.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 7d. to 2s. 11d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3⅛d. to 5d. per lb. LONDON : 4½d. to 5d.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND : £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON : £3 19s. per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON : £27 per ton. SCOTLAND : 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON : White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND : White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER : White, £32 to £34; brown, £30 10s.

LEAD NITRATE.—£28 per ton. MANCHESTER : £27 10s. to £28.

LEAD, RED.—SCOTLAND : £25 10s. to £28 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND : £39 per ton, carriage paid. LONDON : £37 10s.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND : Ground calcined, £9 per ton, ex store.

METHYLATED SPIRIT.—61 O.P. Industrial, 1s. 6d. to 2s. 1d. per gal. Pyridinised industrial, 1s. 8d. to 2s. 3d. Mineralised, 2s. 7d. to 3s. 1d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND : Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—8½d. to 9d. per lb. without engagement.

POTASH, CAUSTIC.—LONDON : £42. MANCHESTER : £37.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5½d. LONDON : 5d. per lb. with usual discounts for contracts. SCOTLAND : 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER : 5d.

POTASSIUM CHLORATE.—LONDON : £37 to £40 per ton. SCOTLAND : 99⅔/100%, powder, £37. MANCHESTER : £38.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND : Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON : 9¼d. per lb. SCOTLAND : B.P. crystals, 9d. MANCHESTER : Commercial, 8¼d. to 8¾d., according to quantity inh 2-cwt. drums; B.P., 9d. to 9¾d.

POTASSIUM PRUSSIATE.—LONDON : 8¼d. to 8¾d. per lb. SCOTLAND : Yellow spot material, 8¼d. ex store. MANCHESTER : Yellow, 8½d.

RUPRON (MINERAL RUBBER).—£16 10s. per ton.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 15s. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. net for spot lots and 4d. per lb. with discounts for contract quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. net.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM META SILICATE.—£16 per ton, d/d U.K. in cwt. bags.

SODIUM NITRITE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£12 10s. per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¾d.

SODIUM SILICATE.—140° Tw. Spot £8 per ton d/d station, returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £14 10s. per ton f.o.b.

SULPHUR.—£10 15s. per ton. SCOTLAND: Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 3s. 11d. to 4s. 1d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON AND SCOTLAND: £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 8½d. to 9d. per lb.; crude, 60's, 2s. 11d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 8d. per lb.; crude, 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale, 98%, 1s. 6d. to 1s. 7d.; according to specification. LONDON: 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor, 1s. 4d. to 1s. 4½d.; 90%, 1s. 4½d. to 1s. 5½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 3½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3d. f.o.r. North; 4d. London. MANCHESTER: 3d. to 4¼d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4¼d.; heavy, 4¼d. to 4½d.

NAPHTHA.—Solvent, 90/160%, 1s. 6d. to 1s. 7d. per gal.; 95/160%, 1s. 7d. to 1s. 8d.; 99/%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Purified crystals, £9 15s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PITCH.—LONDON: £2 19s. to £3 1s. per ton f.o.b. East Coast port for next season's delivery.

PYRIDINE.—90/140, 5s. 9d. to 7s. per gal.

TOLUOL.—90%, 2s. 3d. per gal.; pure, 2s. 6d.

XYLOL.—Commercial, 2s. 2d. per gal.; pure, 2s. 4d.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.

BENZIDINE, HCL.—2s. 5d. per lb.

p-CRESOL 34-5° C.—2s. per lb. in ton lots.

m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE, SOLID.—£72 per ton.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags; £79 5s. in casks, in 1-ton lots.

α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE P.G.—1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—9½d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 to £10. Grey, £15 to £16. Liquor, brown, 30° Tw., 7d. to 9d. per gal. MANCHESTER: Brown, £12 10s.; grey, £17 10s.

ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.

AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.

CHARCOAL.—£5 10s. to £9 10s. per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 9d. per gal.

WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 3d. jer gal. Solvent, 3s. 9d. to 4s. 6d. per gal.

WOOD TAR.—£2 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Home: £7 5s. per ton delivered in 6-ton lots to farmer's nearest station. Export: Nominal £5 17s. 6d. per ton f.o.b. U.K. ports in single bags.

CYANAMIDE.—£7 5s. per ton carriage paid to any railway station in Great Britain in lots of 4 tons and over.

NITRATE OF SODA.—£7 18s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.

NITRO-CHALK.—£7 5s. per ton delivered in 6-ton lots to farmer's nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 15s. to £11 6s. per ton according to percentage of constituents.

NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton according to percentage of constieuents.

Latest Oil Prices

LONDON, May 16.—LINSEED OIL was firmer. Spot, £23 (small quantities 30s. extra); June, £21 12s. 6d.; July-Aug., £21 15s.; Sept.-Dec., £22 2s. 6d.; Jan.-April, £22 5s., sellers. RAPE OIL was steady. Crude extracted, £28; technical refined, £29 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £13 10s.; refined common edible, £16 10s.; and deodorised, £18, naked, ex mill (small lots 30s. extra). TURPENTINE was quiet. American spot, 46s. 9d. per cwt.

HULL.—LINSEED OIL, spot, quoted £22 5s. per ton; May, £21 15s.; May-Aug., £22; Sept.-Dec., £22 5s.; Jan.-April, £22 10s., naked. COTTON OIL.—Egyptian, crude, spot, £13 15s.; edible refined, spot, £16; technical, spot, £16; deodorised, £18, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £15 10s., naked. GROUNDNUT OIL.—Extracted, spot, £19 10s.; deodorised, £23 10s. RAPE OIL.—Extracted, spot, £27; refined, £28 10s. SOYA OIL.—Extracted, spot, £16; deodorised, £19 per ton. COD OIL, 25s. per cwt. CASTOR OIL.—Pharmaceutical, 35s. 6d.; first, 30s. 6d.; second, 27s. 6d. per cwt. TURPENTINE, American, spot, 48s. 9d. per cw.t

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Dates of Application

SILICEOUS ALUMINFEROUS MINERALS, decomposition.—A. L. Mond (Chemische Fabrik Buckau). Aug. 3, 1932. 409,710.

BUTYL ALCHOL and acetone, process of producing.—A. O. Smith Corporation. Aug. 6, 1931. 409,730.

AERATING LIQUIDS, apparatus.—G. S. Higginson and J. C. Vredenburg. Aug. 6, 1932. 409,731.

SUBSTANCES PRODUCING FLUORESCENCE and soluble in hydrocarbon oils, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Aug. 29, 1932. 409,696.

CARBON-CONTAINING FERTILISERS, manufacture and production. J. Y. Johnson (I. G. Farbenindustrie). Sept. 30, 1932. 409,658.

CATALYTIC SYNTHESIS *of heterocyclic bases*.—Goodyear Tire and Rubber Co. June 27, 1932. 409,732.

UNSATURATED ESTERS and intermediates, manufacture.—Imperial Chemical Industries, Ltd., W. Cocker, J. S. H. Davies and R. Hill. Oct. 3, 1932. 409,733.

HEAT-STABLE AND ACID-RESISTING COATINGS on the surfaces of articles, method of and apparatus for providing.—Deutsche Edelstahlwerke A.-G., and E. F. Kruppa. June 2, 1932. 409,718-9.

OLEFINES, hydration.—H. Dreyfus. Nov. 2, 1932. 409,676.

CENTRIFUGAL EXTRACTING or drying apparatus.—T. E. Perks. Nov. 1, 1932. 409,671.

AMINO AZO COMPOUNDS, process for the manufacture.—I. G. Farbenindustrie. Nov. 7, 1931. 409,728.

BENZANTHRENE, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Nov. 10, 1932. 409,770.

ELIMINATING ARSENIC from concentrated sulphuric acid, process of and apparatus.—H. Frischer. Nov. 10, 1932. 409,771.

DIPHENYL DERIVATIVES, production and use.—Rubber Service Laboratories Co. Sept. 26, 1932. 409,773.

INSULATING MATERIALS, process for the manufacture.—I. G. Farbenindustrie. Nov. 11, 1831. 409,774.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. Nov. 11, 1931. 409,775.

REMOVAL OF SUBSTANCES forming resins from benzines which are to be employed as motor fuels.—J. Y. Johnson (I. G. Farbenindustrie). Nov. 28, 1932. 409,813.

REFINING OR PURIFICATION OF BENZOL, petrol and like light spirits.—Refiners, Ltd., and T. Scott. Dec. 3, 1932. 409,816.

CATALYTIC REACTIONS, carrying out.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 19, 1932. 409,824.

CHRYSENE, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 31, 1932. 409,837.

TITANIUM AND IRON COMPOUNDS, preparation.—P. Spence and Sons, Ltd., and W. B. Llewellyn. Jan. 18, 1933. 409,847.

ALKALI METAL CARBAMATES, production.—Mathieson Alkali Works. March 31, 1932. 409,871.

HYDROCARBON OILS, cracking.—H. A. Gill (Standard Oil Co., Indiana). March 9, 1933. 409,875.

HYDROCARBON OIL DISTILLATES, refining.—Universal Oil Products Co. May 25, 1932. 409,901.

REFINING CRUDE COPPER, process.—Soc. D'Electrochimie, D'Electro-Metallurgie, et des Acieries Electriques D'Ugine. June 6, 1932. 409,910.

DEOXIDATION and purification of copper.—Soc. D'Electrachimie, D'Electro-Metallurgie, et des Acieries Electriques D'Ugine. June 6, 1932. 409,911.

Complete Specifications Open to Public Inspection

HIGH FLASH HYDROFORMED SOLVENTS.—Standard Oil Development Co. Nov. 1, 1932. 20458/33.

MAGNESIUM ALLOYS, process of making and refining.—I. G. Farbenindustrie. Nov. 5, 1932. 23000/33.

OLEFINE ALCOHOLS and their derivatives, process for the production.—H. T. Böhme A.-G. Nov. 5, 1932. 28710/33.

UNSATURATED ALCOHOLS, process for the conversion.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 4, 1932. 29356/33.

SUBSTANCES HAVING WETTING, washing, emulsifying, and like properties and the products obtained thereby, processes for manufacturing. E. A. Mauersberger. Nov. 2, 1932. 29923/33.

HYDROXYDIPHENYLENE COMPOUNDS, process for the manufacture.—I. G. Farbenindustrie. Nov. 1, 1932. 30389/33.

AZO DYESTUFFS, process for the manufacture.—I. G. Farbenindustrie. Nov. 5, 1932. 30584/33

ORGANIC MERCURY COMPOUNDS, manufacture.—I. G. Farbenindustrie. Nov. 5, 1932. 30585/33.

DYESTUFFS OF THE OXAZINE SERIES, manufacture.—I. G. Farbenindustrie. Nov. 3, 1932. 30616/33.

MIXED CHROMIFEROUS AZO DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. Nov. 7, 1932. 30796/33.

POLYMERIC CARBOXYLIC ACIDS, manufacture of products.—I. G. Farbenindustrie. Nov. 5, 1932. 30798/33.

DETERGENT COMPOUNDS and their application, manufacture.—E. I. du Pont de Nemours and Co. Nov. 4, 1932. 30810/33.

FILTERS, more particularly for hydrocarbons.—J. Muller. Nov. 5, 1932. 30835/33.

ORGANIC PRODUCTS and processes for making same.—Mantle Lamp Co. of America. Aug. 20, 1931. 13405/34.

INSECTICIDAL, fungicidal, and like materials, manufacture.—E. I. du Pont de Nemours and Co., Sept. 24, 1932. 13815/34.

Applications for Patents

SALTS, production. E. J. Cross, Norsk Hydro-Elektrisk Kvaelstofaktieselskab. May 1. 13129.

COLOUR LAKES, preparation of. S.F.W. Crundall, A. Hancock, and P. Spence and Sons, Ltd. May 2. 13204.

VINYL RESIN DISPERSIONS, etc., manufacture. F. B. Dehn, and Rohm and Haas A.-G. April 26. 12664.

MANUFACTURE OF SHEETS from polymerization products.—Deutsche Celluloid-Fabrik, and W. W. Groves. April 27. 12753.

POLYMERISATION OF METHYL METHACRYLATE.—E. I. Du Pont de Nemours and Co. April 26. (United States, April 26, '33). 12628.

ALKALI METAL CYANIDES, manufacture.—E. I. Du Pont de Nemours and Co., and H. N. Gilbert. May 11. 13163. 13164.

VIOLANTHRONE DERIVATIVES, preparation.—E. I. Du Pont de Nemours and Co. May 1. (United States, May 3, '33). 13165.

ORGANIC SULPHUR COMPOUNDS, manufacture.—E. I. Du Pont de Nemours and Co. May 2. (United States, May 2, '33). 13305.

HEAVY HYDROGEN, etc., production.—A. Farkas, L. Farkas and E. K. Rideal. April 27. 12727.

ACTIVE CARBON, manufacture.—W. Fuchs. May 2. 13220.

OXIDES, manufacture.—W. Fuchs. May 2. 13221.

LAKE COLOURS, manufacture.—A. A. Harrison, and Imperial Chemical Industries, Ltd. April 26. 12631.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie, and J. Y. Johnson. April 26. 12635.

DYESTUFFS.—I. G. Farbenindustrie, and J. Y. Johnson. April 26. 12636.

VAT DYESTUFFS.—I. G. Farbenindustrie, and J. Y. Johnson. April 26. 12637.

ACID DYESTUFFS, manufacture.—I. G. Farbenindustrie, and J. Y. Johnson. April 28. 12875.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie, and J. Y. Johnson. April 28. 12876. 12892.

DYESTUFFS of the dioxazine series, manufacture.—I. G. Farbenindustrie. April 26. (Germany, April 26, '33.) 12619.

DERIVATIVES of N-butyl-amino benzene, manufacture.—I. G. Farbenindustrie. April 27. (Germany, April 27, '33.) 12757.

DERIVATIVES of N-butyl-amino benzene, manufacture.—I. G. Farbenindustrie. April 27. (Germany, Aug. 10, '33.) 12758.

MANUFACTURE of compositions containing chlorinated rubber.—I. G. Farbenindustrie. April 27. (Germany, April 28, '33. 12832.

FERTILISERS, manufacture.—I. G. Farbenindustrie. April 30. (Germany, May 10, '33.) 12971.

CONDENSATION PRODUCTS of carbenium compounds, manufacture.—I. G. Farbenindustrie. May 2. (Germany, May 2, '33.) 13248.

GLYOXYLIC ACID, manufacture.—I. G. Farbenindustrie. May 2. (Germany, May 4, '33.) 13249.

TEXTILE ASSISTANTS.—Imperial Chemical Industries, Ltd. April 26. 12630.

CYCLIC KETONES, manufacture.—Maschmeijer Jr. Chemische Fabriek. April 26. (France, Dec. 15, '33.) 12605.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works. April 30. (United States, April 6, '34.) 13023.

ALKENES, etc., manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. April 30. (Holland, May 15, '33.) 12977.

CELLULOSE ESTER COMPOSITIONS for moulding purposes.—H. A. Auden, Distillers Co., Ltd., P. Eaglesfield, and H. P. Staudinger. May 9. 14023.

HYDROCARBON OILS, treatment of.—Standard Oil Co., Indiana. April 30. (United States, May 3, '33.) 13025.

HYDROCARBON LIQUIDS, treatment.—Anglo-Persian Oil Co., Ltd., and S. F. Birch. May 9. 14011.

BLACK OXIDE OF IRON.—J. W. Ayers. May 3. 13397.

ALDOL, etc., manufacture.—British Industrial Solvents, Ltd., E. E. Connolly, H. K. Norman and E. S. Pemberton. May 5. 13667.

ESTERS of 2-ethylbutanol-1.—Carbide and Carbon Chemicals Corporation. May 4. (United States, May 12, '33.) 13536.

HYDROGENATION OF ETHYLPROPYLACROLEIN.—Carbide and Carbon Chemicals Corporation and W. J. Toussaint. May 8. 13885.

PRESERVING ORGANIC SUBSTANCES.—H. L. Cox. May 8. 13933.

PRESERVING ORGANIC SUBSTANCES.—Carbide and Carbon Chemicals Corporation. May 8. 13933.

ASPHALTIC, etc., emulsions.—E. I. du Pont de Nemours and Co. May 4. (United States, May 6, '33.) 13595.

ALKYLAMINES, manufacture.—A. Carpmael and I. G. Farbenindustrie. May 5. 13649.

ACTIVE ABSORBENT CARBON, production.—Chemical and Biological Products Co., Ltd. May 8. (Belgium, May 8, '33.) 13931.

HYDRATOPECTIN, manufacture.—J. Clement, A. Mace, S. G. Rabaté (nee Grillon). May 9. (France, May 13, '33.) 14059.

SOLUBLE STARCH, manufacture.—Duintjer Wilkens Meihuizen and Co. Naamlooze Vennootschap. May 3. (Germany, May 5, '33.) 13422.

Company News

Eastman Kodak Co.—A quarterly dividend of $1 per common share, is announced payable on July 2.

The International Nickel Co. of Canada.—A dividend of 10 cents. per common share has been declared payable on June 30.

Tate and Lyle, Ltd.—An interim dividend of 6 per cent. is announced on the ordinary shares, payable on June 15.

Celanese Corporation of America.—A dividend of $1 per share is announced on the 7 per cent. cumulative first participating preferred stock, payable on June 1.

United Water Softeners.—For the year 1933 a profit of £8,892 is reported. After payment of the preference dividend £5,694 is carried forward.

British Bitumen Emulsions Co.—The report for the year 1933 shows a loss of £5,181. After deducting £4,844 brought forward, adn providing £1,188 for tax, there remains a debit of £1,525 to be carried forward.

North British Rubber Co.—The report for 1933 shows a trading profit of £60,914, againste a loss of £34,897 in 1932. The net profit of £20,430 compares with a loss of £72,837, and the balance carried forward is up from £2,599 to £23,029.

The British Cotton and Wool Dyers' Association, Ltd.—A net profit of £59,944 is reported for the year to March 31, 1934, compared with £62,780 for 1932-33. The ordinary dividend is repeated at 5 per cent., less tax. The amount carried forward is £46,956, compared with £35,719 brought in.

Books Received

Wachse, Wachsahnliche Stoffe und Technische Wachsgemenge. By Emil J. Fischer. Dresden and Leipzig: Theodor Steinkopff. Pp. 192. RM. 13.

Introductory Colloid Chemistry. By Harry N. Holmes. London: Chapman and Hall. Pp. 198. 15s. 6d.

Conductometric Analysis. By Hubert T. S. Britton. London: Chapman & Hall. Pp. 178. 12s. 6d.

Unfallverhutungsvorschriften d. Berufsgenossenschaft d. chemischen Industrie. Berlin: Carl Hehmanns. Pp. 230. RM4.

International Coal Carbonisation. By John Roberts and Dr. Adolk Jenkner. London: Pitman. Pp. 453. 35s.

Thorpe's Dictionary of Applied Chemistry. Supplement Vol 1. A to M. By J. F. Thorpe and M. A. Whiteley. London: Longmans, Green & Co. Pp. 680. 60s.

The Principles of Domestic and Institutional Laundrywork. By Agnes Jackman and B. Rogers. London: Edward Arnold & Co. Pp. 232. 5s.

Combustion from Heracleitos to Lavoisier. By Joshua C. Gregory. London: Edward Arnold & Co. Pp. 228. 10s. 6d.

Official Publications

The Lancashire Coalfield. Department of Scientific and Industrial Research. Fuel Research. Physical and Chemical Survey of the National Coal Resources No. 32. London: H.M. Stationery Office. Pp. 80. 2s.

Memorandum on Precautions against Dangers of Poisoning Fire and Explosion in connection with the use of Carbon Bisulphide in Artificial Silk, India Rubber and other Works. London: H.M. Stationery Office. Pp. 7. 3d.

Annual Report of the Central Narcotics Intelligence Bureau, Egyptian Government, for the year 1933. Cairo: "Publications Office," Government Press. Pp. 168. P.T.10.

The National Physical Laboratory Report for the Year 1933. London: H.M. Stationery Office. Pp. 264. 13s.

New Companies Registered

Athole G. Allen (Stockton), Ltd., Princes Wharf, 135 Grosvenor Road, S.W.1.—Registered May 1. Nominal capital, £20,000. To acquire the business of a chemical and explosive manufacturer and merchant carried on by A. G. Allen as Athole G. Allen and Co., at Stockton-on-Tees Chemical Works, Stockton-on-Tees, and to carry on the business of manufacturers of and dealers in fertilisers, oils, laboratory reagents, chemical and photographic materials, etc. Governing director and chairman: Athole G. Allen.

Athole G. Allen (London), Ltd., Princes Wharf, 135 Grosvenor Road, S.W.—Registered May 1. Nominal capital £5,000. To acquire the business of a chemical and explosives manufacturer and merchant carried on by A. G. Allen as Athole G. Allen and Co., at Princes Wharf, 135 Grosvenor Road, S.W., and to carry on the business of manufacturers of and dealers in fertilisers, oils, laboratory reagents, chemical and photographic materials, etc. Governing director and chairman: Athole G. Allen.

Alkenes, Ltd., 7 Staple Inn, E.C.—Registered May 2. Nominal capital £100. Objects: To acquire from E. H. Strange, the benefit of part of an agreement dated December 16, 1932, between himself and M. L. Bramson, providing payment for research work relating to processes for the manufacture of solvents and synthetic products from hydrocarbons and from pyrogenic decomposition products of mineral oils, petroleum, coal, lignite, shale and other like carboniferons materials, and for the use of laboratories and chemical apparatus belonging to the said E. H. Strange, and to carry on research work. Directors: Edward H. Strange, Thomas Kane, Wilfred A. Strange.

Ceradur Wax Refining Company, Ltd., 4 Lloyds Avenue, London, E.C.3.—Registered May 14. Nominal capital £500. Manufacturers of and dealers in insulating and other varnishes and lacquers and insulating materials of all descriptions, varnishes, paint, colours, pigments, oils, wax and tallow, etc. Directors: Dr. Leonard Levy, William Calderwood.

R. Carter and Co. (Blackburn), Ltd., Wellington New Mill, Bolton Road, Blackburn.—Registered May 10. Nominal capital, £1,000. To acquire the business of fertiliser and chemical manufacturer carried on by Raymond Carter as "R. Carter and Co.," at Newton Street, Blackburn. Directors: Raymond Carter, Wm. Carter, Percy E. Brierley.

Thermax Distillation Processes, Ltd., Imperial Works, Clement Street Parade, Birmingham.—Registered April 30. Nominal capital, £300. To acquire from Maurice Lambot an exclusive licence to make, use and vend in the British Empire certain inventions and patented articles, and to carry on the business of makers of and dealers in all kinds of plant for carbonisation and distillation of any kind of material capable of being so treated, whether by heat or by electrical, chemical or other processes, etc. Directors: Harry J. Peart, Percy Jump, Leon Bailly, Sidney Stockell, Maurice Lambot, Lucien Clerox.

Vick Chemical (Products), Ltd., First Avenue House, High Holborn, London, W.C.1.—Registered May 10. Nominal capital £500. Manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, disinfectants, fertilisers, etc. Directors: Harry Wilson, Harold F. Burton, Alfred E. Vick, Alexander W. M. Dalison.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of the Interior is calling for tenders, to be presented in Cairo by June 11, 1934, for the supply of an electrically-driven vertical-spindle type pump, capacity 650 litres per second. (Ref. G.Y./13794.)

From Week to Week

OXFORD AND SHIPTON CEMENT, LTD., states that Sir Maurice Bonham-Carter and Mr. Niels Max Jensen have joined the board.

THE KING has given his patronage to the annual meeting of the Society of Chemical Industry, to be held at Cardiff from July 16 to 20.

A FIRE OCCURRED at Eccles' Oil Works, on the boundary of Blackburn, on May 15, when two thousand barrels of crude oil, valued at £6,000, exploded, and the buildings became a raging inferno. The total damage is estimated at over £10,000.

NOTICE WAS GIVEN in the "London Gazette" of May 11 of the voluntary winding up of National Chemical Holdings, Ltd. (incorporated under the Guernsey Companies Act). Mr. Farrar W. Thomas, of 6 New Street, Guernsey, has been appointed liquidator.

LORD LEVERHULME has accepted the chairmanship of the Liverpool School of Tropical Medicine in succession to Sir Frederick Bowring, who, for reasons of health, has asked to be relieved of the office, although willing to remain a member of the committee.

THE NOMINAL CAPITAL of Bovril, Ltd., 148/166, Old Street, E.C., has been increased by the addition of £500,000 beyond the registered capital of £3,250,000. The additional capital is divided into 500,000 4½ per cent. cumulative pre-preference shares of £1 each.

RECENT WILLS include Mr. Neville Holt Joy (45), of The Hall, Cottingham, Yorkshire, a director of Reckitt and Sons, of Hull, £75,868 (net personalty £73,918); Mr. William Parsons (65), of Howell Hill Lodge, Ewell, Surrey, a director of Thomas Parsons and Sons, Ltd., Oxford Street, London, manufacturers of varnishes, enamels, etc., £63,412 (net personalty £53,032.).

A 17-YEARS-OLD GIRL, Elma Green, was overcome with fumes when a tank of ammonia burst in a workroom of a firm engaged in the manufacture of permanent waving requisites in Brixton Road, London, on May 9. Mr. Bier, a partner in the firm, fought his way through the fumes and carried her to safety. She was taken to hospital and later was allowed to go home.

THREE THOUSAND TONS OF BITUMEN and rags used in the manufacture of linoleum were destroyed in a disastrous fire which broke out at the West Lancashire Linoleum Works at Appley Bridge, near Wigan, on May 14. The damage is estimated at several thousand pounds. These works are situated on the banks of the Leeds and Liverpool Canal, and firemen improvised a bridge across the canal with an old barge in order to get hose and equipment near to the blaze. The works will not be closed and no one will be thrown out of work.

A NEW COMPANY, Universal Rubber-Linoleum, Ltd., has been formed to acquire the benefits of certain patents and a licence relating to the use of rubber in the manufacture of floor coverings of the linoleum type. Its primary operations will be directed to manufacturing and marketing floor coverings under its patents. Advantages in respect of price, durability, etc., are claimed for the company's commodity, but the company has not yet started to do business—indeed, no plant has yet been provided or factory premises obtained. Application will be made to the committee of the Stock Exchange for permission to deal in the shares of the company "after production of the first trading accounts."

THE IMPORT DUTIES ADVISORY COMMITTEE has received applications (a) for a reduction in the import duty on borax (refined), and (b) for the addition to the free list of silicon and alloys or mixtures thereof containing not less than 95 per cent. of silicon. Representations should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, Westminster, London, S.W.1, not later than June 11. The Committee has decided not to make any recommendations in respect of applications for the addition to the free list of barytes, dry earth colours, and alloys or mixtures of calcium and silicon or of calcium, silicon and iron, containing not less than 20 per cent. of calcium and not less than 60 per cent. of silicon.

CARL OLOF LUNDHOLM, who died at Upper Norwood, London, on May 8, was one of the ablest pioneers of the explosives industry. He was born at Stockholm in 1850. After qualifying as a chemical engineer he was engaged as chemist or manager in various industrial operations, and in 1878, through the instrumentality of Nobel, he joined Nobel's Explosives Co., Ltd., Glasgow, as assistant manager at their Ardeer factory, near Stevenston. For about two years he planned and designed a factory for the manufacture of fulminate of mercury for use in detonators, and when the factory was completed at Westquarter, Stirlingshire, in 1880, Lundholm became its manager. After spending a year in studying Continental methods of manufacturing nitro-glycerine explosives Lundholm returned to Ardeer in 1887 as assistant manager, and two years later he succeeded to the managership, a position he retained for 20 years. From 1909, when he was succeeded by the late Sir Frederick Nathan until his final retirement in 1914, he was technical adviser to the Nobel Dynamite Trust.

THE NAME of New Soaps, Ltd., Corporation Works, Newport, Mon., has been changed to Newport (Mon.) Paints and Chemicals, Ltd.

THE LIQUIDATORS OF ONVERWACHT PLATINUM, LTD., give notice of a first and final distribution of 1s. 5¼d. per 10s. share, payable in South African currency. Cheques despatched from the London agents will be posted around May 30.

SIR RICHARD REDMAYNE was elected president of the Institution of Civil Engineers at the annual meeting in London last week. He succeeds Brigadier-General Sir Henry P. Maybury. Sir Richard Redmayne, who will be 69 in July, was from 1908 to 1920 H.M. Inspector of Mines.

THE MOSSEND STEEL WORKS of William Beardmore and Co., Ltd., which has been closed down since 1928, has been purchased by Colvilles, Ltd. The works are said to be the most modern in the country, but Colvilles intimate that there is little hope of the plant going into active production although portions of the works may be utilised.

AT THE CLOSE OF THE MEETING of the Welsh Tinplate Pool Conference held at Swansea on May 8, it was announced that it was decided to continue the principle of the pool indefinitely, leaving any modification to a committee. It was further decided to continue the fixed prices scheme. International quotas were also discussed, and this question was left to Sir William Firth, chairman of Richard Thomas and Co., Ltd., who presided.

ARRANGEMENTS HAVE BEEN MADE by Wheal Reeth Tin, Ltd., to sell its mining rights in respect of about 110 acres to a new company called "Wheal Breage Tin, Ltd." The purchase price is £40,000 in fully-paid shares of that company, which will have a toal authorised capital of £100,000, of which £50,000 is being issued immediately for cash, and £10,000 in shares will remain available for issue in the future if necessary. The whole of the issue has been underwritten and sub-underwritten, and will be offered for subscription immediately after Whitsun.

PRODUCTION OF LIQUID FUEL FROM COAL has been carried a step further by successful preparation of a Diesel engine oil. A sample of such oil, produced at the Askern plant of Low Temperature Carbonisation, Ltd., has been sent for test at the Admiralty research station, Gosport, where it will be tried in submarine engines. After coal is distilled and petrol extracted, there remains a neutral oil that so far has been used only as a source of fuels for burning under boilers. Some years of research have yielded a finishing process that makes this oil suitable for direct combustion in Diesel engines, and thus enhances its value. A claim for this fuel oil is that it can be adapted for use in either high or low speed Diesel engines with cylinders of any diameter. The yield is about seven gallons per ton of coal.

IN THE KING'S BENCH DIVISION on Wednesday, Mr. Justice Hawke concluded the hearing of an action by Mr. Arthur Joseph Barling of Lymington Road, West Hampstead, against Morgan Davies and Son, Ltd., of Pitfield Street, N., to recover damages for alleged misrepresentation in the sale of two chemists' shops. Defendants denied all the allegations made against them. Plaintiff's case was that by an agreement of June, 1933, he agreed to purchase chemists' shops at Kings Road, Chelsea, and at Farringdon Street, E.C., with the lease and goodwill for £990 on the representation that the takings at the Chelsea shop were £32 a week, and for the Farringdon Street shop £24 to £25 a week. Plaintiff complained that the lease of the Chelsea shop was not assigned to him and that the takings were below the figures represented by Mr. Renchaw, a director of the defendant company. Plaintiff now sought damages and/or the return of the money he had paid. After hearing the legal arguments his lordship entered judgment for the defendants with costs.

IN AN INTERIM REPORT to the shareholders of Low Temperature Carbonisation, Ltd., the directors state that contracts have been placed for the plant and materials required for a further battery of retorts at the Askern works. It is expected that these extensions will be completed and in operation by October 1 next. All the material has now been delivered for the first works in France, the construction of which should be completed in July. Negotiations are actively proceeding in connection with the erection of two further works in England, and a great deal of preliminary work has already been accomplished. The directors hope to make an important announcement during the next few weeks. It is stated that, as a result of new developments in the company's process, the quality of the smokeless fuel has been still further improved and the demand has surpassed all records. Both works are operating at maximum capacity and will continue to do so. In the opinion of the directors, the position and prospects of the company are most satisfactory and better than at any previous time in its history. It is added that production and sales continue to expand and the profits for the current year should show a marked improvement upon last year's figures.

ADVERTISERS please note that the latest hour at which we can accept advertisements for insertion in these columns each week is 10 o'clock on Thursday morning.

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